

From: Atkinson, Emily

Location: WJC-N 5400

Conference Code

Importance: Normal

Subject: Meet with NEDA/CAP (Confirmed)

Categories: Business, Blue Category

Start Date/Time: Tue 10/27/2015 7:15:00 PM

End Date/Time: Tue 10/27/2015 8:00:00 PM

Re: Is it possible that you are available on Oct. 28 to meet with NEDA between 10-3?

Confirmed 10/27 at 3:15pm: Is it possible that you are available on Oct. 28 to meet with NEDA between 10-3?

Oct. 27 NEDA/CAP Meeting with Janet at 3:15: Conference Call In Number

Re: ozone (offset) implementation ideas and also about the CPP from a manufacturing perspective (e.g., who owns the ERCs, what happens if there are additional NSPS on an industry sector)

To: McCabe, Janet; Jordan, Debbie; Goffman, Joe; Harvey, Reid; Culligan, Kevin; Carbon Pollution Input Calendar; Koerber, Mike; Mathias, Scott; Page, Steve; Santiago, Juan

Outside Attendees (in person):

- Jen Kreusch, Eli Lilly & Co.
- Barbara Bankoff for Eli Lilly & Co.
- Jennifer Cogswell, Koch Minerals
- Rob Kaufmann or Steve Lomax, Koch Public Sectors
- Edward Ferguson, Boeing Corp.
- Dana Wood, BP America
- Anu Kunapuli, Merck & Co.
- Leslie Ritts, NEDA/CAP

Outside Attendees (by phone)

- Matt Iwicki, Boeing Legal Seattle
- Maxine Dewbury, Procter & Gamble
- Al Collins, Occidental Petroleum
- Possible Todd Rallison, Intel
- Robert Hermanson, BP

To: Leslie Ritts[lsritts@rittslawgroup.com]; babankoff@gmail.com[babankoff@gmail.com]
From: Atkinson, Emily
Sent: Wed 10/14/2015 7:41:54 PM
Subject: Confirmed 10/27 at 3:15pm: Is it possible that you are available on Oct. 28 to meet with NEDA between 10-3?

Hi Leslie,

You are confirmed for a 45 minute meeting on Tuesday, October 27 at 3:15pm Janet McCabe.

Directions and procedures to 1200 Pennsylvania Avenue NW:

Metro: If you come by Metro get off at the Federal Triangle metro stop. Exit the metro station and go up two sets of escalators to the surface level and turn right. You will see a short staircase and wheelchair ramp leading to a set of glass doors with the EPA logo - that is the William Jefferson Clinton Federal Building, North Entrance.

Taxi: Direct the taxi to drop you off on 12th Street NW, between Constitution and Pennsylvania Avenues, at the elevator for the Federal Triangle metro stop - this is almost exactly half way between the two avenues on 12th Street NW. Facing the building with the EPA logo and American flags, walk toward the building and take the glass door on your right hand side with the escalators going down to the metro on your left – that is the North Lobby of the William Jefferson Clinton building.

Security Procedures: A government issued photo id is required to enter the building and it is suggested you arrive 15 minutes early in order to be cleared and arrive at the meeting room on time. Upon entering the lobby, the meeting attendees will be asked to pass through security and provide a photo ID for entrance. Let the guards know that you were instructed to call 202-564-7404 for a security escort.

Please send me a list of participants in advance of the meeting and feel free to contact me should you need any additional information.

Emily

Emily Atkinson
Staff Assistant

Immediate Office of the Acting Assistant Administrator
Office of Air and Radiation, USEPA
Room 5406B, 1200 Pennsylvania Avenue NW
Washington, DC 20460

Voice: 202-564-1850
Email: atkinson.emily@epa.gov

From: Leslie Ritts [<mailto:lsritts@gmail.com>] **On Behalf Of** Leslie Ritts
Sent: Wednesday, October 14, 2015 1:27 PM
To: Atkinson, Emily; babankoff@gmail.com
Subject: RE: Is it possible that you are available on Oct. 28 to meet with NEDA between 10-3?

Emily – that would be AWESOME!



Leslie Sue Ritts

Ritts Law Group, PLLC

620 Fort Williams Parkway

Alexandria, VA 22304

(703) 823-2292 (office)

(571) 970-3721 (fax)

(703) 966-3862 (cell)

lsritts@rittslawgroup.com

PRIVILEGE AND CONFIDENTIALITY NOTICE

This message is intended only for the use of the individual or entity to which it is addressed and may contain information that is privileged, confidential and exempt from disclosure under applicable law as attorney client and work-product confidential or otherwise confidential communications. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this communication or other use of a transmission received in error is strictly prohibited. If you have received this transmission in error, immediately notify us at the above telephone number.

From: Atkinson, Emily [<mailto:Atkinson.Emily@epa.gov>]
Sent: Wednesday, October 14, 2015 9:37 AM
To: babankoff@gmail.com; lsritts@rittslawgroup.com
Subject: RE: Is it possible that you are available on Oct. 28 to meet with NEDA between 10-3?

Hi Barbara and Leslie,

It looks like we could fit this in as a 45 minute meeting here at EPA on Tuesday, October 27 at 3:15pm. Let me know if this could work on your end.

Thanks.

Emily

Emily Atkinson
Staff Assistant

Immediate Office of the Acting Assistant Administrator
Office of Air and Radiation, USEPA
Room 5406B, 1200 Pennsylvania Avenue NW
Washington, DC 20460
Voice: 202-564-1850
Email: atkinson.emily@epa.gov

From: barbara bankoff [<mailto:babankoff@gmail.com>]
Sent: Monday, October 12, 2015 10:09 AM
To: Leslie Ritts
Cc: McCabe, Janet; Atkinson, Emily
Subject: Re: Is it possible that you are available on Oct. 28 to meet with NEDA between 10-3?

Oops. I believe the meeting at NEDA is on Tuesday the 27th.

Also, I emailed with Janet. Wish we had seen each other face to face, but not this time! Soon, I hope.

Barb

On Mon, Oct 12, 2015 at 10:00 AM, Leslie Ritts <lsritts@rittslawgroup.com> wrote:

Dear Janet-

I didn't have the heart to bother you on Thursday pm when we were in the cab line at DCA, but is it possible you are available on October 28th to meet with NEDA/CAP at Lilly's offices (a block up the street from EPA on 12th and E)? We can as easily come to EPA if it makes the meeting doable.

Barb Bankoff said she saw you on Friday and I should check with you and Emily. I may have dropped the ball on this because I had called Andrea and had not heard back.

(I also have not submitted a meeting form request WHICH I WOULD GLADLY DO if it is possible to sneak the appointment in.)

We would like to talk with you on some ozone (offset) implementation ideas and also about the CPP from a manufacturing perspective (e.g., who owns the ERCs, what happens if there are additional NSPS on an industry sector).

Let me know..

Thanks and hope you were able to get home for a gorgeous fall weekend,

<image001.png>

Leslie Sue Ritts

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To: Atkinson, Emily[Atkinson.Emily@epa.gov]
Cc: Dennis, Allison[Dennis.Allison@epa.gov]
From: McCabe, Janet
Sent: Tue 10/13/2015 11:02:37 PM
Subject: Re: Is it possible that you are available on Oct. 28 to meet with NEDA between 10-3?

Sure that'll work

Sent from my iPhone

On Oct 13, 2015, at 3:49 PM, Atkinson, Emily <Atkinson.Emily@epa.gov> wrote:

So it looks like we could fit this in as a 45 minute meeting here at EPA on Tuesday, October 27 right at 3pm. It would mean you would delegate a Tom Burke "Briefing on First Draft ISA for Sulfur Oxides" meeting. Would this be ok?

From: barbara bankoff [<mailto:babankoff@gmail.com>]
Sent: Monday, October 12, 2015 10:09 AM
To: Leslie Ritts
Cc: McCabe, Janet; Atkinson, Emily
Subject: Re: Is it possible that you are available on Oct. 28 to meet with NEDA between 10-3?

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From: Atkinson, Emily
Location: WJC-N 5400 + Dial in
Importance: Normal
Subject: OTC Meeting (Confirmed)
Categories: Personal, Green Category
Start Date/Time: Thur 11/5/2015 1:00:00 PM
End Date/Time: Thur 11/5/2015 1:45:00 PM

Conference Code

Signed ltr to Gina032.pdf

OTC 2015 Fall Meeting Agenda v1.doc

Re: Invitation: OTC Fall Meeting - November 5, 2015

Executive Session Issues for EPA 10-28-2015.docx

RE: Invitation: OTC Fall Meeting - November 5, 2015

RE: Invitation: OTC Fall Meeting - November 5, 2015

Executive Session Issues

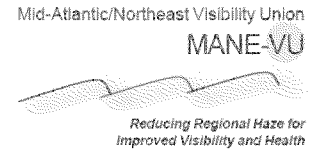
- 1) Enforcing the Running of EGU Controls: Is the federal backstop anticipated in November on schedule and will that rule ensure that electric generation units run controls optimally?
- 2) Limitations with CSAPR Framework: What changes can we expect when the CSAPR framework is applied to the 2008 ozone NAAQS? To the 2015 ozone NAAQS?
- 3) 2008 RACT as Transport Strategy: RACT has been a basic tool to address transport and broadly applied provides needed emission reductions and a level playing field.
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- 5) Expediting 2018 Good Neighbor FIP: Many states rely on or at least wait for EPA's federal backstop/FIP before making Good Neighbor SIP commitments; kicking any action an additional 2-years further down the road. Will EPA develop and promulgate the 2015 federal backstop (FIP) in parallel while states prepare and submit Good Neighbor SIPs due in 2018?
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- 8) How can EPA work with states to address emissions from the legacy mobile source fleet?
- 9) Regional Haze Planning: The regional haze planning by MANE-VU is resource intensive and state funded. The target in MANE-VU is for states to submit RH SIPs in 2018; however, but we are concerned that EPA guidance and rules still being developed may increase the burden on member states and MANE-VU. What assurance can you provide that our progress would not be sidelined due to efforts to provide other areas a longer planning horizon?
- 10) Alternatives to State-by-State Adoption of Model Rules: At the 2015 OTC Annual Meeting we mutually agreed to use OTC Model Rules already developed as a starting point to explore voluntary program options as alternatives to EPA rulemaking. On Aftermarket Catalyst Replacements, EPA has been fully engaged, as well as additional states, CARB and stakeholder groups, and options are being vetted. While we have had productive dialogue with stakeholders on VOC and HAP emission reductions from AIM Coatings and Consumer Products, EPA has not participated in these discussions. What is the commitment and intent of EPA to continue to look at these alternatives?
- 11) OTC Resources: Improving resources and funding for achieving the goals of the OTC, including leadership and coordination of technical work among regional planning organizations and their members outside of the OTR and MANE-VU region.



OTC/MANE-VU Fall Meeting

Thursday, November 5, 2015

Hilton Baltimore
401 W. Pratt Street
Baltimore, Maryland



AGENDA

9:30 AM	OTC/ MANE-VU Fall Meeting: Opening Statement	<i>Jared Snyder, Chair Assistant Commissioner, NYS DEC</i>
9:35 AM	Welcome and Introductions <ul style="list-style-type: none">• Goals for Today's Meeting	<i>Jared Snyder, Chair Assistant Commissioner, NYS DEC MANE-VU Chair</i>
9:45 AM	EPA Air Program Update	<i>Gina McCarthy- invited Administrator US EPA</i>
10:45 AM	Report of the Executive Director	<i>David Foerter, Executive Director, OTC</i>
11:00 AM	Regional Modeling and Transport Analysis <ul style="list-style-type: none">• Update on Modeling Activities• Emission Inventory Progress	<i>Jeff Underhill, NH DES</i>
12:00 PM	Working Lunch	<i>Invited Speaker</i>
1:00 PM	Stationary/Area Sources Committee and Mobile Sources Committee Reports	<i>Ali Mirzakhali, DE DNREC Chris Salmi, NJ DEP</i>
1:45 PM	MANE-VU Technical Support Committee Report	<i>Rob Sliwinski, NYS DEC</i>
2:45 PM	Stakeholder Comments	<i>In order of sign-up sheet</i>
3:15 PM	OTC Formal Actions <ul style="list-style-type: none">• Discussion and Voting• Adopt Minutes of June 2015 Annual Meeting• Elect New Treasurer / Secretary	<i>Jared Snyder, Chair Assistant Commissioner, NYS DEC</i>
3:45PM	MANE-VU Formal Actions <ul style="list-style-type: none">• Discussion and Voting• Adopt Minutes of November 2014 Fall Meeting	<i>MANE-VU Chair</i>
4:00 PM	Closing Remarks and Adjournment	<i>Jared Snyder, Chair Assistant Commissioner, NYS DEC</i>

To: McCabe, Janet[McCabe.Janet@epa.gov]
Cc: Atkinson, Emily[Atkinson.Emily@epa.gov]; Stewart, Lori[Stewart.Lori@epa.gov]
From: Dennis, Allison
Sent: Sun 10/11/2015 6:03:49 PM
Subject: Re: Invitation: OTC Fall Meeting - November 5, 2015

Will do!

Sent from my iPhone

On Oct 11, 2015, at 10:34 AM, McCabe, Janet <McCabe.Janet@epa.gov> wrote:

Allison---I am perfectly happy to join them by phone on the morning of the 5th. Let's tell Dave that and see if between that, and Reid (who can readily talk about two of the biggest issues they are always interested in--CPP and Transport), that'll satisfy them.

Thanks.

From: Dennis, Allison
Sent: Friday, October 9, 2015 5:34 PM
To: Atkinson, Emily
Cc: Stewart, Lori; McCabe, Janet
Subject: RE: Invitation: OTC Fall Meeting - November 5, 2015

Janet,

Both Reid and Rick H. plan to attend. Reid also spoke with Dave Foerter and Dave mentioned that he also intends to invite a senior manager from OTAQ to participate on mobile sources.

SO, with this added bit of info...are you leaning toward having a combo of Reid/Debbie (who's available, judging by her calendar) cover for you at the in-person meeting on the 5th OR would you like to call in at 8 am on Nov. 5th? Thanks!

Have a great weekend,

Allison

From: Atkinson, Emily
Sent: Friday, October 09, 2015 1:03 PM
To: Dennis, Allison
Cc: Stewart, Lori; McCabe, Janet
Subject: FW: Invitation: OTC Fall Meeting - November 5, 2015

David Foerter would like to have a conversation with you about EPA's participation in the upcoming OTC event. He can be reached at 202-508-3840 through his assistant, Kromeklia Bryant.

He just called to inquire about how to work Janet into their agenda so she could participate by phone either the evening of Wednesday, November 4 or early in the morning on Thursday, November 5. David is aware that Janet is booked both days, but would like to have another EPA representative participate.

Emily Atkinson
Staff Assistant

Immediate Office of the Acting Assistant Administrator
Office of Air and Radiation, USEPA
Room 5406B, 1200 Pennsylvania Avenue NW
Washington, DC 20460
Voice: 202-564-1850
Email: atkinson.emily@epa.gov

From: McCabe, Janet
Sent: Wednesday, September 16, 2015 7:28 PM
To: Dennis, Allison; Atkinson, Emily; Stewart, Lori
Subject: FW: Invitation: OTC Fall Meeting - November 5, 2015

This is the day of our retreat, so it's going to be tough, pretty impossible, for me to attend as usual.

From: Kromeklia Bryant [<mailto:kbryant@otcair.org>]

Sent: Wednesday, September 16, 2015 3:20 PM

To: Mccarthy, Gina

Cc: McCabe, Janet; scheduling; Dubin, Noah; Atkinson, Emily; Drinkard, Andrea; David Foerter

Subject: Invitation: OTC Fall Meeting - November 5, 2015

Dear Administrator McCarthy,

Please find attached a formal invitation to speak at the upcoming Fall meeting of the Ozone Transport Commission. The original letter should arrive in the next few days.

Sincerely,

Kromeklia Bryant

Office Manager

Ozone Transport Commission

444 North Capitol St., NW Suite 322

Washington, DC 20001

202-508-3840

To: Dennis, Allison[Dennis.Allison@epa.gov]
Cc: Kromeklia Bryant[kbryant@otcair.org]; Atkinson, Emily[Atkinson.Emily@epa.gov]; Drinkard, Andrea[Drinkard.Andrea@epa.gov]
From: David Foerter
Sent: Wed 10/28/2015 8:15:03 PM
Subject: RE: Invitation: OTC Fall Meeting - November 5, 2015
Executive Session Issues for EPA 10-28-2015.docx

Allison – Attached are issues that the Commissioners are likely to want to discuss with Jane McCabe, or at least start a dialogue. It is likely that the Chair and Vice-Chair (Jared Snyder/NY and Ben Grumbles/MD) will want to set up a meeting with Janet later in November or early December. Also the attached are issues that the Commissioners are still discussing right up until they ‘meet’ with Janet on November 5th.

Best Regards

Dave

David C. Foerter

Executive Director

Ozone Transport Commission

and MANE-VU

444 N. Capitol Street, NW

Suite 322

Washington, DC 20001

Phone: (202) 508-3840

Cell: (703) 402-6921

FAX: (202) 508-3841

Email: dfoerter@otcair.org

From: Dennis, Allison [mailto:Dennis.Allison@epa.gov]

Sent: Tuesday, October 27, 2015 1:12 PM
To: David Foerter
Cc: Kromeklia Bryant; Atkinson, Emily; Drinkard, Andrea
Subject: RE: Invitation: OTC Fall Meeting - November 5, 2015

Thanks and will do! Also, can you send me the latest copy of the agenda?

And, please do send those questions to us as soon as you can so we can prepare Janet for them.

From: David Foerter [<mailto:dfoerter@otcair.org>]
Sent: Tuesday, October 27, 2015 12:09 PM
To: Dennis, Allison <Dennis.Allison@epa.gov>
Cc: Kromeklia Bryant <kbryant@otcair.org>; Atkinson, Emily <Atkinson.Emily@epa.gov>; Drinkard, Andrea <Drinkard.Andrea@epa.gov>
Subject: RE: Invitation: OTC Fall Meeting - November 5, 2015

Allison – YES to 8:00 to 8:45 AM EDT call in on November 5th! Tell Janet thank you from me for being flexible. I'll make sure we have the commissioners and Air Directors assembled so we can start promptly at 8:00 AM. We'll get you call-in information and questions shortly.

FYI – I've spoken with both Karl Simon/OTAQ and Reid Harvey/CAMD and they are preparing to do the public presentation on Nov 5th and are likely to want be in the room during the State/EPA Executive Session where Janet will be on the phone.

Thank you

Dave

David C. Foerter
Executive Director

Ozone Transport Commission

and MANE-VU

444 N. Capitol Street, NW

Suite 322

Washington, DC 20001

Phone: (202) 508-3840

Cell: (703) 402-6921

FAX: (202) 508-3841

Email: dfoerter@otcair.org

From: Dennis, Allison [<mailto:Dennis.Allison@epa.gov>]

Sent: Tuesday, October 27, 2015 11:37 AM

To: David Foerter

Cc: Kromeklia Bryant; Atkinson, Emily; Drinkard, Andrea

Subject: RE: Invitation: OTC Fall Meeting - November 5, 2015

Hi David,

For Janet's call into the meeting, can we make 8 – 8:45 am work on Nov. 5th? Also, can you send me the call in details? Janet is booked for an all-day meeting on the 4th so she will only be able to participated on the Nov. 5th 8 am time slot.

From: David Foerter [<mailto:dfoerter@otcair.org>]

Sent: Thursday, October 22, 2015 5:02 PM

To: Dennis, Allison <Dennis.Allison@epa.gov>

Cc: Kromeklia Bryant <kbryant@otcair.org>

Subject: RE: Invitation: OTC Fall Meeting - November 5, 2015

Allison – Thank you for contacting us.

While there are two different opportunities for the OTC Commissioners to hear from Acting Assistant Administrator Janet McCabe, I have placed a higher importance on what had been originally scheduled to be the “OTC States and EPA Executive Session”, and understand that EPA is working to have other EPA staff available to provide an update at the November 5th public meeting (see agenda).

The original time slot to have a call with the Commissioners in the “Executive Session” is still available from 8:00 – 9:15 am on Nov. 5th ; however, if more convenient for a call, The OTC Commissioners are meeting on Wednesday, November 4th from 11:00 am until 5:30 pm. It is also probable, that we could extend that time beyond 5:30 pm if it is convenient for Janet McCabe. That essentially leaves a window of 11 am until at least 5:30 pm available for Janet to be on a call on Nov. 4th, or the original timeslot of 8-9:15 am on Nov. 5th. I appreciate Janet’s flexibility!

That having been said, I have attached the agenda for the OTC/MANE-VU public meeting on Thursday, Nov. 5th.

Feel free to contact me.

Best Regards

Dave

David C. Foerter

Executive Director

Ozone Transport Commission

and MANE-VU

444 N. Capitol Street, NW

Suite 322

Washington, DC 20001

Phone: (202) 508-3840

Cell: (703) 402-6921

FAX: (202) 508-3841

Email: dfoerter@otcair.org

From: Kromeklia Bryant

Sent: Thursday, October 22, 2015 4:03 PM

To: David Foerter

Subject: FW: Invitation: OTC Fall Meeting - November 5, 2015

From: Dennis, Allison [<mailto:Dennis.Allison@epa.gov>]

Sent: Thursday, October 22, 2015 3:41 PM

To: Kromeklia Bryant

Subject: RE: Invitation: OTC Fall Meeting - November 5, 2015

Hi Kromeklia,

When you get a chance , can you send me the latest version of your agenda. Also, do you all have a preference for when Janet calls in? Also, how long should we time Janet's remarks for (30 min?) and Q&A ? Lastly, I'm assuming you want Janet to hit all of the topics mentioned in the invite to the Administrator, correct? Thanks! /Allison

From: Dennis, Allison

Sent: Sunday, October 11, 2015 2:05 PM

To: kbryant@otcair.org

Subject: Fwd: Invitation: OTC Fall Meeting - November 5, 2015

Hi! Janet can call into your meeting the morning of the 5th. I'll be in touch about timing (8 vs 830 am) .

Sent from my iPhone

Begin forwarded message:

From: "Atkinson, Emily" <Atkinson.Emily@epa.gov>
To: "Dennis, Allison" <Dennis.Allison@epa.gov>
Subject: FW: Invitation: OTC Fall Meeting - November 5, 2015

From: Kromeklia Bryant [<mailto:kbryant@otcair.org>]
Sent: Wednesday, September 16, 2015 3:20 PM
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Cc: McCabe, Janet; scheduling; Dubin, Noah; Atkinson, Emily; Drinkard, Andrea; David Foerter
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Executive Session Issues

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Sent: Mon 11/2/2015 8:49:12 PM
Subject: RE: Invitation: OTC Fall Meeting - November 5, 2015

Allison – To shed light on the question, when rolling out the revised standard, the EPA website had a map with a bar that as it rolled across the US, nonattainment areas miraculously disappeared leaving very few areas with nonattainment or any sense of responsibility to reduce transported emissions. The issue being raised is we struggle with modeling attainment under the old 75 ppb standard, and measures on the books or on the way are not sufficient. Its more perception than reality. Janet McCabe may have had a similar question asked at the recent NACAA meeting.

I have set up a line that Janet McCabe and OTC can both dial into for the 8:00 to 8:45 am call on November 5th.

Dial in :
Passcode:

As a backup number, my cell phone/text is 703/402-6921

We are looking forward to speaking with Janet McCabe on Thursday, Nov. 5th at 8:00 AM.

Best Regards

Dave

David C. Foerter

Executive Director

Ozone Transport Commission

and MANE-VU

444 N. Capitol Street, NW

Suite 322

Washington, DC 20001

Phone: (202) 508-3840

Cell: (703) 402-6921

FAX: (202) 508-3841

Email: dfoerter@otcair.org

From: Dennis, Allison [mailto:Dennis.Allison@epa.gov]
Sent: Monday, November 02, 2015 3:00 PM
To: David Foerter
Cc: Kromeklia Bryant; Atkinson, Emily; Drinkard, Andrea
Subject: RE: Invitation: OTC Fall Meeting - November 5, 2015

Hi David and Kromeklia,

I just wanted to see if you all had a chance yet to see my question for clarification below yet.
Thanks! /Allison

From: Dennis, Allison
Sent: Friday, October 30, 2015 11:01 AM
To: 'David Foerter' <dfoerter@otcair.org>
Cc: Kromeklia Bryant <kbryant@otcair.org>; Atkinson, Emily <Atkinson.Emily@epa.gov>;
Drinkard, Andrea <Drinkard.Andrea@epa.gov>
Subject: RE: Invitation: OTC Fall Meeting - November 5, 2015

Hi David,

I have a clarification question for question #6 The issue/question #6 reads: EPA's 2025 Projection: EPA's 2025 modeling indicates most areas would achieve the 2015 revised ozone NAAQS. This message appears to be inconsistent with modeling and monitoring.

Not sure if OTC is referring to specific modeling or just generally.

Can you provide more background? Thanks! /Allison

From: David Foerter [<mailto:dfoerter@otcair.org>]
Sent: Tuesday, October 27, 2015 1:29 PM
To: Dennis, Allison <Dennis.Allison@epa.gov>
Cc: Kromeklia Bryant <kbryant@otcair.org>; Atkinson, Emily <Atkinson.Emily@epa.gov>; Drinkard, Andrea <Drinkard.Andrea@epa.gov>
Subject: RE: Invitation: OTC Fall Meeting - November 5, 2015

Attached is the current agenda for the OTC/MANE-VU public meeting. The States/EPA Executive session is starts at 8:00 am.

The questions will be sent over today, but anticipate these are the subject areas and the Commissioners will be asking the questions directly. As in the past, we are hoping for a dialogue between Commissioners and Janet McCabe.

Dave

David C. Foerter

Executive Director

Ozone Transport Commission

and MANE-VU

444 N. Capitol Street, NW

Suite 322

Washington, DC 20001

Phone: (202) 508-3840

Cell: (703) 402-6921

FAX: (202) 508-3841

Email: dfoerter@otcair.org

From: Dennis, Allison [<mailto:Dennis.Allison@epa.gov>]
Sent: Tuesday, October 27, 2015 1:12 PM
To: David Foerter
Cc: Kromeklia Bryant; Atkinson, Emily; Drinkard, Andrea
Subject: RE: Invitation: OTC Fall Meeting - November 5, 2015

Thanks and will do! Also, can you send me the latest copy of the agenda?

And, please do send those questions to us as soon as you can so we can prepare Janet for them.

From: David Foerter [<mailto:dfoerter@otcair.org>]
Sent: Tuesday, October 27, 2015 12:09 PM
To: Dennis, Allison <Dennis.Allison@epa.gov>
Cc: Kromeklia Bryant <kbryant@otcair.org>; Atkinson, Emily <Atkinson.Emily@epa.gov>; Drinkard, Andrea <Drinkard.Andrea@epa.gov>
Subject: RE: Invitation: OTC Fall Meeting - November 5, 2015

Allison – YES to 8:00 to 8:45 AM EDT call in on November 5th! Tell Janet thank you from me for being flexible. I'll make sure we have the commissioners and Air Directors assembled so we can start promptly at 8:00 AM. We'll get you call-in information and questions shortly.

FYI – I've spoken with both Karl Simon/OTAQ and Reid Harvey/CAMD and they are preparing

to do the public presentation on Nov 5th and are likely to want be in the room during the State/EPA Executive Session where Janet will be on the phone.

Thank you

Dave

David C. Foerter

Executive Director

Ozone Transport Commission

and MANE-VU

444 N. Capitol Street, NW

Suite 322

Washington, DC 20001

Phone: (202) 508-3840

Cell: (703) 402-6921

FAX: (202) 508-3841

Email: dfoerter@otcair.org

From: Dennis, Allison [<mailto:Dennis.Allison@epa.gov>]

Sent: Tuesday, October 27, 2015 11:37 AM

To: David Foerter

Cc: Kromeklia Bryant; Atkinson, Emily; Drinkard, Andrea

Subject: RE: Invitation: OTC Fall Meeting - November 5, 2015

Hi David,

For Janet's call into the meeting, can we make 8 – 8:45 am work on Nov. 5th? Also, can you send me the call in details? Janet is booked for an all-day meeting on the 4th so she will only be able to participated on the Nov. 5th 8 am time slot.

From: David Foerter [<mailto:dfoerter@otcair.org>]
Sent: Thursday, October 22, 2015 5:02 PM
To: Dennis, Allison <Dennis.Allison@epa.gov>
Cc: Kromeklia Bryant <kbryant@otcair.org>
Subject: RE: Invitation: OTC Fall Meeting - November 5, 2015

Allison – Thank you for contacting us.

While there are two different opportunities for the OTC Commissioners to hear from Acting Assistant Administrator Janet McCabe, I have placed a higher importance on what had been originally scheduled to be the “OTC States and EPA Executive Session”, and understand that EPA is working to have other EPA staff available to provide an update at the November 5th public meeting (see agenda).

The original time slot to have a call with the Commissioners in the “Executive Session” is still available from 8:00 – 9:15 am on Nov. 5th; however, if more convenient for a call, The OTC Commissioners are meeting on Wednesday, November 4th from 11:00 am until 5:30 pm. It is also probable, that we could extend that time beyond 5:30 pm if it is convenient for Janet McCabe. That essentially leaves a window of 11 am until at least 5:30 pm available for Janet to be on a call on Nov. 4th, or the original timeslot of 8-9:15 am on Nov. 5th. I appreciate Janet's flexibility!

That having been said, I have attached the agenda for the OTC/MANE-VU public meeting on Thursday, Nov. 5th.

Feel free to contact me.

Best Regards

Dave

David C. Foerter

Executive Director

Ozone Transport Commission

and MANE-VU

444 N. Capitol Street, NW

Suite 322

Washington, DC 20001

Phone: (202) 508-3840

Cell: (703) 402-6921

FAX: (202) 508-3841

Email: dfoerter@otcair.org

From: Kromeklia Bryant

Sent: Thursday, October 22, 2015 4:03 PM

To: David Foerter

Subject: FW: Invitation: OTC Fall Meeting - November 5, 2015

From: Dennis, Allison [<mailto:Dennis.Allison@epa.gov>]

Sent: Thursday, October 22, 2015 3:41 PM

To: Kromeklia Bryant

Subject: RE: Invitation: OTC Fall Meeting - November 5, 2015

Hi Kromeklia,

When you get a chance , can you send me the latest version of your agenda. Also, do you all have a preference for when Janet calls in? Also, how long should we time Janet's remarks for (30 min?) and Q&A ? Lastly, I'm assuming you want Janet to hit all of the topics mentioned in the invite to the Administrator, correct? Thanks! /Allison

From: Dennis, Allison
Sent: Sunday, October 11, 2015 2:05 PM
To: kbryant@otcair.org
Subject: Fwd: Invitation: OTC Fall Meeting - November 5, 2015

Hi! Janet can call into your meeting the morning of the 5th. I'll be in touch about timing (8 vs 830 am) .

Sent from my iPhone

Begin forwarded message:

From: "Atkinson, Emily" <Atkinson.Emily@epa.gov>
To: "Dennis, Allison" <Dennis.Allison@epa.gov>
Subject: FW: Invitation: OTC Fall Meeting - November 5, 2015

From: Kromeklia Bryant [<mailto:kbryant@otcair.org>]
Sent: Wednesday, September 16, 2015 3:20 PM
To: McCarthy, Gina
Cc: McCabe, Janet; scheduling; Dubin, Noah; Atkinson, Emily; Drinkard, Andrea; David Foerter
Subject: Invitation: OTC Fall Meeting - November 5, 2015

Dear Administrator McCarthy,

Please find attached a formal invitation to speak at the upcoming Fall meeting of the Ozone Transport Commission. The original letter should arrive in the next few days.

Sincerely,

Kromeklia Bryant

Office Manager

Ozone Transport Commission

444 North Capitol St., NW Suite 322

Washington, DC 20001

202-508-3840



September 16, 2015

The Honorable Gina McCarthy
U.S. Environmental Protection Agency
William Jefferson Clinton Building
1200 Pennsylvania Avenue, NW
Mail Code 1101A
Washington, DC 20460

Connecticut

Delaware

District of Columbia

Maine

Maryland

Massachusetts

New Hampshire

New Jersey

New York

Pennsylvania

Rhode Island

Vermont

Virginia

David C. Foerter
Executive Director

444 N. Capitol St. NW
Suite 322
Washington, DC 20001
(202) 508-3840
FAX (202) 508-3841
Email: ozone@otcair.org

Dear Administrator McCarthy:

The Ozone Transport Commission (OTC or Commission) and the Mid-Atlantic-Northeast Visibility Union (MANE-VU) are pleased to extend an invitation to you to speak at our Fall Meeting on November 5, 2015 at the Hilton Baltimore Hotel in Baltimore, Maryland. We have tentatively scheduled time for you to speak from 10:00 – 11:00 am, but we would be happy to accommodate a time that is workable for your schedule, and are prepared to adjust other sessions on the agenda as necessary.

We are also holding an Executive Session between the OTC member states and senior EPA managers from 8:00 am to 9:15 am the morning of November 5th, and are hoping you will join us for those discussions.

Given the anticipation of EPA issuing a revised ozone standard and the subsequent implementation of the revised standard, the Commission is very interested in hearing about how far we have come and how far we still need to go to provide the health protection afforded by the ozone standard and the Clean Air Act. As the fall meeting combines ozone transport and regional haze policy issues, the Commission is also interested in EPA's view of where we stand and how to make needed progress in achieving the region's air quality goals. The Commission is also interested in knowing EPA's goals and outlook for the future of the nation's air quality and how the Agency will move forward to continue to protect public health and the environment. We aim to understand how our states can more effectively work with EPA to realize its vision and understand how to connect our work toward a higher level of environmental stewardship and sustainability, to protect communities at risk, and promote the public trust.

A number of critical policy issues continue to face EPA, and the OTC states hope to discuss several of them during the Executive Session. Some of these issues include:

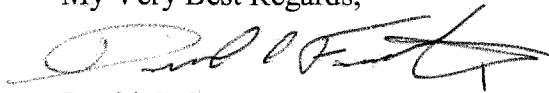
- Near and longer term strategies for ozone transport and broader cooperation to implement these strategies;
- EPA's plans to address mobile sources emissions beyond Tier 3 and the legacy and new fleet of light, medium and heavy-duty vehicles;
- Timely interstate transport and attainment planning under a revised 2015 ozone standard.

- Improving funding for achieving the goals of OTC, and Regional Planning Organizations, including for regional haze.

We know that there are many challenges as well as successes and look forward to continuing to work together to achieve needed air quality results.

Attached please find the draft agenda for this meeting. We appreciate your consideration of our invitation and look forward to a response at your earliest convenience. For more information about OTC or any questions about the OTC/MANE-VU Fall Meeting, please contact me at 202-508-3840 or via email at dfoerter@otcair.org.

My Very Best Regards,

A handwritten signature in black ink, appearing to read 'David C. Foerter', with a stylized flourish at the end.

David C. Foerter
Executive Director, OTC

cc: Janet McCabe, Acting Assistant Administrator EPA OAR

From: Atkinson, Emily

Location: DCRoomARN1332Poly/DC-ARN-OAR, **Conference Code** Participant Code

Conference Code

Importance: Normal

Subject: Meet with Members of the Manufacturing Action Council & Regulatory Improvement Council (Confirmed)

Categories: Business, Blue Category

Start Date/Time: Mon 11/9/2015 4:00:00 PM

End Date/Time: Mon 11/9/2015 4:45:00 PM

RE: Invitation to Meet with Members of the Manufacturing Action Council & Regulatory Improvement Council

JanetMcCabeEventFormOct2015.docx (1).pdf

2014 Manufacturing Action Council Membership List and Mission Statementpdf

2015 Regulatory Improvement Council Mission Statement and Membership Lis....pdf

Confirmed 11/6 at 9:30am: Invitation to Meet with Members of the Manufacturing Action Council & Regulatory Improvement Council

To: McCabe, Janet; Joe Goffman; Jordan, Debbie; Culligan, Kevin; Dunham, Sarah; Paul Gunning; Steve Page; Mike Koerber; Peter Tsirigotis; Ben Hengst

Outside Attendees (in person): TBD

Event Information Form

This form has been designed to assist in planning participation in events and activities.
This is not a confirmation of DAA Janet McCabe's attendance.

Basic Background

Name of Event	Meeting with Trade Association Coalition Members
Sponsoring Organization	Manufacturing Action Council (MAC) & the Regulatory Improvement Council (RIC)
Date of Event	Options include: Tues., Oct. 13 (morning); Weds., Oct. 14; Thurs., Oct. 15 (afternoon); Tues., Oct. 20; Weds., Oct. 21; Thurs., Oct. 22; or later October/early November, as is convenient.
Time of Event	Anytime that fits with DAA McCabe's schedule
Expected time of remarks or participation by DAA McCabe	45 minutes
Location (please include city/town and street address)	At the EPA itself.
Directions to the event (if appropriate, please also include relevant information about parking, the specific building, and best entrance to use)	n/a
Where to meet POC	

Event Description and Role of the DAA

Brief description or outline of the event	Meeting with 12-20 trade association leaders. The event will begin with 5 minutes of introductions around the room; then 10-15 minutes of remarks by DAA McCabe; then 10-15 minutes of Q&A (with possibly a few brief sectoral reports from the various industries represented-approx. 5 mins only).
Brochure, invitation and/or other event material(s)	Membership & Mission statements for the Regulatory Improvement Council & the Manufacturing Action Council are attached as file attachments.
Agenda and order of speakers and biography/information of other speakers	Introduction of Janet McCabe by Wayne Valis, followed by self-introductions around the room; followed by her speaking; followed by Q&A.
Name of person introducing DAA McCabe	Wayne Valis
Basic information about the role of the DAA official at the event. (For example, will they	She will be the featured speaker at this 45-minute roundtable discussion.

serve as a keynote speaker? Participate on a panel? Take part in a press conference? Tour a facility?)	
If the DAA official is a featured speaker, which topic(s) should they address and how long?	Our members are interested in the Janet McCabe-eye-view of EPA's 2015-16 agenda for air, and to discuss current challenges facing the business community. She should speak for 15-20 minutes, and then there will be time for her to hear comments from various sectoral trade association leaders and to answer questions.
What rules would the audience like to hear about?	
Will there be time for Q&A? If so, who will be moderating?	Yes. Wayne Valis will moderate.
Do you have a sense of the types of questions that may be asked?	Probably some questions regarding the recent ozone rules and the Clean Power Plan.
Recommendations on the use of visuals/PowerPoint. Should the DAA official plan on using a PowerPoint Presentation?	No.
What is the physical layout of the room (e.g. size, and format of the interaction; podium, seated in armchair dialogue, or at a table, etc.)	If you have a room with armchair dialogue or a roundtable discussion, that would be best.

About the Audience

Please tell us about the make-up of the audience for the event:	Trade association leaders, which can include the president/CEO, Government Affairs vice president, and also trade association directors who focus on air issues.
Expected number in attendance at the event	Typically we get between 12-20 people in attendance. We will send you updated attendance lists as soon as possible.
Will it be largely members of your organization?	Yes. These will be trade association members representing several sectors of the American economy, all of whom belong to either the Manufacturing Action Council or to the Regulatory Improvement Council--both coalitions run by Valis Associates.
Will others be in attendance? If so, who will be at the event? (General public, Businesspeople, Educators, Families, Students – what grade level, Children – how old)	The staff of Valis Associates will also attend: Wayne Valis, President; Maura Valis Lint (VP of Valis Associates); and Blair Shipp (Director of Communications).

Others? (Please describe)	No.
Is the event open to press?	No.

Contact Information

Your name:	Maura Valis Lint or Blair Shipp
Telephone Number:	202-393-5055
Mailing Address:	Valis Associates 1101 17th St., NW, Suite 608, Washington, DC 20036
E-Mail Address:	wvalis@wvalisllc.com
Cell Phone Number:	703-434-2398 (Maura's cell)
Fax Number:	n/a
Best way to reach you at the event?	Cell phone

EPA Contact Person

Emily Atkinson, Administrative Assistant to Janet McCabe: 202-564-7403

Andrea Drinkard, Public Affairs Specialist: 202-564-1601

To: Dennis, Allison[Dennis.Allison@epa.gov]; Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Stewart, Lori
Sent: Thur 10/8/2015 2:40:20 PM
Subject: RE: Invitation to Meet with Members of the Manufacturing Action Council & Regulatory Improvement Council

For now, let's just include Joe and Debbie and then we can check with Janet about adding others.

From: Dennis, Allison
Sent: Thursday, October 08, 2015 10:07 AM
To: Atkinson, Emily; Stewart, Lori
Subject: RE: Invitation to Meet with Members of the Manufacturing Action Council & Regulatory Improvement Council

Hmm. I defer to Lori on staffing recommendations but I don't think Janet would want a lot of people in the room. Maybe just Debbie and Joe since they want to talk about ozone and CPP mostly?

From: Atkinson, Emily
Sent: Tuesday, October 06, 2015 12:22 PM
To: Dennis, Allison; Stewart, Lori
Subject: RE: Invitation to Meet with Members of the Manufacturing Action Council & Regulatory Improvement Council

Hi Lori and Allison,

Any guidance on who should needs to join Janet for this meeting? Before I get back to the requestor re: dates/times, I would like to know who else needs to be there so I only offer times when the group (and not just Janet) is available.

Thanks.

Emily

From: Dennis, Allison
Sent: Friday, October 02, 2015 9:45 AM
To: Maura Valis Lint
Cc: Atkinson, Emily
Subject: RE: Invitation to Meet with Members of the Manufacturing Action Council & Regulatory Improvement Council

Hi Maura,

Thank you for sending this additional information. Janet is delighted to meet with your group.

Emily will work with you to identify a time that works best for everyone. Thanks! Best, Allison

From: Wayne Valis [<mailto:wvalis@wvalisllc.com>] **On Behalf Of** Maura Valis Lint
Sent: Thursday, October 01, 2015 2:19 PM
To: Dennis, Allison
Cc: Atkinson, Emily
Subject: RE: Invitation to Meet with Members of the Manufacturing Action Council & Regulatory Improvement Council

Dear Allison,

Here is the event form; I had to save it as a pdf, as it wouldn't format correctly with other options. If you need an editable document, I could share the google doc with you, if needed.

Also attached are the mission statement and membership list for the two coalitions from whom people would be attending, the Regulatory Improvement Council and the Manufacturing Action Council.

Please let me know if you need any more information.

Best,

Maura

Maura Valis Lint

Vice President

Valis Associates

(o) 202-393-5055

(c) 703-434-2398

From: Dennis, Allison [<mailto:Dennis.Allison@epa.gov>]

Sent: Wednesday, September 23, 2015 11:07 PM

To: wvalis@wvalisllc.com

Cc: Atkinson, Emily

Subject: Re: Invitation to Meet with Members of the Manufacturing Action Council & Regulatory Improvement Council

Hi Wayne,

Thank you for reaching out and thinking of Janet to brief your membership on OAR's priorities for the coming year. At your earliest convenience, can you please complete and send back the attached event form? Thank you. Best,

Allison

From: Atkinson, Emily

Sent: Tuesday, September 22, 2015 4:49 PM

To: Dennis, Allison

Subject: FW: Invitation to Meet with Members of the Manufacturing Action Council & Regulatory Improvement Council

+ the attachments.

From: Wayne H. Valis [<mailto:wvalis@wvalisllc.com>]

Sent: Tuesday, September 22, 2015 2:13 PM

To: McCabe, Janet

Cc: Atkinson, Emily; 'Wayne Valis'; bshipp@wvalisllc.com

Subject: Invitation to Meet with Members of the Manufacturing Action Council & Regulatory Improvement Council

Dear Janet,

I know you have attended several of my coalition meetings at EPA during your tenure—I believe one with Bob Perciasepe, and one with Gina McCarthy.

In light of the Volkswagen emissions scandal and so many other major issues, I respectfully request a meeting with you and my Manufacturing Action Council (MAC) and Regulatory Improvement Council (RIC) (please see attached membership lists and mission statements) at your earliest convenience, hopefully in late October/November.

There are so many issues in your area of responsibility that my members have been urging me to schedule a time with you. As you know, EPA and these coalitions have been meeting for three decades, and the meetings are always interesting, informative, and mutually beneficial. You will be able to roll many meetings into one—in less than an hour.

I hope you can arrange a 45-minute session to give us the Janet McCabe-eye view of EPA's 2015/16 agenda for air and to discuss current challenges facing the business community. Some proposed dates are: Tuesday, October 13th; Wednesday, October 14; Thursday, October 15th; Tuesday, October 20; Wednesday, October 21; or Thursday, October 22. If none of these dates work on your end, we would be happy to work with your scheduler to find dates in late October/early November that are mutually convenient.

Thank you, and I look forward to hearing positively from you.

With best regards,

Wayne Valis

Wayne H. Valis
President
Valis Associates, LLC
1101 17th St., NW, Suite 608
Washington, DC 20036
202-393-5055
wvalis@wvalisllc.com

From: Atkinson, Emily
Location: WJC-N 5400
Importance: Normal
Subject: Washington Post Interview re: ozone
Start Date/Time: Fri 10/2/2015 6:45:00 PM
End Date/Time: Fri 10/2/2015 7:00:00 PM

From: Adm13McCarthy, Gina
Location: Room 3415
Importance: Normal
Subject: Ozone Press Call
Start Date/Time: Thur 10/1/2015 6:15:00 PM
End Date/Time: Thur 10/1/2015 7:00:00 PM

******Please DO NOT forward this calendar invitation. You may “Accept” or “Decline” the invitation but DO NOT respond with questions or concerns. If you do have any questions or concerns about this invitation please contact the Scheduling Office at scheduling@epa.gov . ******

SCt: Arian Herckis
Ct: Liz Purchia, 202-564-6691

Staff:
Janet McCabe, John Millett, Deborah Jordan, Erika Sasser, Karen Wesson (OAR)
Liz Purchia, Melissa Harrison (OPA)

Run of Show:
2:15 PM: Prep
2:30 PM: Press Call

From: Adm13McCarthy, Gina
Location: Administrator's Office + Video Conference Line: RTP Room C401A
Importance: Normal
Subject: Ozone Rule Signing
Start Date/Time: Thur 10/1/2015 2:30:00 PM
End Date/Time: Thur 10/1/2015 2:45:00 PM

SCt: Liel Azoolin; Ct: Kristien Knapp, 202-564-3277

Staff:

Janet McCabe, Deborah Jordan, Lori Stewart, John Millett, Britney McCoy, Allison Dennis, Nate McMichael (OAR)

David Orlin, Steve Silverman, Melina Williams (OGC)

Jeff Herrick, James Brown, Tom Luben, Jason Sacks, Tom Long (ORD)

Darryl Weatherhead, Erika Sasser, Karen Wesson, Scott Mathias, Mary Henigin, Alan Rush, Amber Iglesias, Steve Page, Mike Koerber, Alison Davis, Bob Hetes, Bryan Hubbell, Charlie Fulcher, Chris Davis, David Misenheimer, Deirdre Murphy, Eloise Shepherd, John Langstaff, Kathy Kaufman, Martha Keating, Nicole Hagan, Regina Chappell, Robin Langdon, Julia Gamas, Scott Jenkins, Stephen Graham, Susan Stone, Travis Smith, Zachary Pekar, Heather Simon, Alison Eyth, Pat Dolwick, Ben Wells, Kevin Cavender, Joan Rice, Halil Cakir, Tyler Fox, Liz Naess, Lew Weinstock, James Hemby, Raj Rao, Ben Garwood, Dan DeRoeck, Carla Oldham, Bob Lingard, Anna Wood, Beth Palma, Amy Lamson, Neal Fann , Breanna Alman (OAR/OAQPA)

From: Atkinson, Emily
Location: WJC-N 5400
Importance: Normal
Subject: Meet with AESI (Advanced Engine Systems Institute) Companies (Confirmed)
Categories: Blue Category
Start Date/Time: Fri 11/6/2015 4:00:00 PM
End Date/Time: Fri 11/6/2015 5:00:00 PM
FW: Meeting request - late October
Confirmed 11/6 at 11am: Meeting request - late October

Re: the future of on-road and off-road vehicle regulation in the context of all sectors and vehicle pollution control technology in general, but also very specifically on the prospects for a national lower NOx standard for heavy-duty engines

To: McCabe, Janet; Grundler, Chris; Hengst, Ben; Charmley, Bill; Jordan, Debbie

Outside Attendees (in person): TBD

To: Chris Miller[cmiller@ajw-inc.com]
From: Atkinson, Emily
Sent: Tue 10/20/2015 2:52:57 PM
Subject: Confirmed 11/6 at 11am: Meeting request - late October

Great Chris, so you are confirmed for a one hour meeting on Friday, November 6 at 11:00am with Janet McCabe.

Directions and procedures to 1200 Pennsylvania Avenue NW:

Metro: If you come by Metro get off at the Federal Triangle metro stop. Exit the metro station and go up two sets of escalators to the surface level and turn right. You will see a short staircase and wheelchair ramp leading to a set of glass doors with the EPA logo - that is the William Jefferson Clinton Federal Building, North Entrance.

Taxi: Direct the taxi to drop you off on 12th Street NW, between Constitution and Pennsylvania Avenues, at the elevator for the Federal Triangle metro stop - this is almost exactly half way between the two avenues on 12th Street NW. Facing the building with the EPA logo and American flags, walk toward the building and take the glass door on your right hand side with the escalators going down to the metro on your left – that is the North Lobby of the William Jefferson Clinton building.

Security Procedures: A government issued photo id is required to enter the building and it is suggested you arrive 15 minutes early in order to be cleared and arrive at the meeting room on time. Upon entering the lobby, the meeting attendees will be asked to pass through security and provide a photo ID for entrance. Let the guards know that you were instructed to call 202-564-7404 for a security escort.

Please send me a list of participants in advance of the meeting and feel free to contact me should you need any additional information.

Emily

Emily Atkinson
Staff Assistant

Immediate Office of the Acting Assistant Administrator
Office of Air and Radiation, USEPA
Room 5406B, 1200 Pennsylvania Avenue NW
Washington, DC 20460
Voice: 202-564-1850
Email: atkinson.emily@epa.gov

From: Chris Miller [mailto:cmiller@ajw-inc.com]
Sent: Tuesday, October 20, 2015 10:46 AM
To: Atkinson, Emily
Subject: Re: Meeting request - late October

Thanks Emily. We are all set for that date and time. Looking forward to seeing Janet and Chris.

Sent from my iPad

On Oct 20, 2015, at 10:43 AM, Atkinson, Emily <Atkinson.Emily@epa.gov> wrote:

Hi Chris,

Just want to follow up to see if you all are available for a meeting on Friday, November 6 at 11:00am for one hour. Let me know if this could work on your end.

Emily Atkinson
Staff Assistant

Immediate Office of the Acting Assistant Administrator
Office of Air and Radiation, USEPA
Room 5406B, 1200 Pennsylvania Avenue NW
Washington, DC 20460
Voice: 202-564-1850
Email: atkinson.emily@epa.gov

From: Chris Miller [mailto:cmiller@ajw-inc.com]
Sent: Wednesday, September 30, 2015 8:44 AM
To: Atkinson, Emily
Subject: Re: Meeting request - late October

Hi Emily - thanks for the response. I think that should work, but let me check with the companies and will get back ASAP. If possible, please hold the time and I will have a firm

answer by this Thursday afternoon.

Chris

Sent from my iPad

On Sep 29, 2015, at 2:45 PM, Atkinson, Emily <Atkinson.Emily@epa.gov> wrote:

Hi Christopher,

It looks like we could fit this in on Janet McCabe and Chris Grundler's calendars for Friday, November 6 at 11:00am for one hour. Let me know if this could work on your end.

Emily

Emily Atkinson
Staff Assistant

Immediate Office of the Acting Assistant Administrator
Office of Air and Radiation, USEPA
Room 5406B, 1200 Pennsylvania Avenue NW
Washington, DC 20460
Voice: 202-564-1850
Email: atkinson.emily@epa.gov

From: Chris Miller [<mailto:cmiller@ajw-inc.com>]
Sent: Wednesday, September 16, 2015 4:40 PM
To: Stewart, Lori; Grundler, Christopher
Cc: Chris Hessler; Charmley, William
Subject: Meeting request - late October

Good afternoon - After the dust on the ozone standard has settled, the execs from my AESI (advanced engine systems institute) companies would very much like to meet with Janet & Chris in DC to talk about the future of on-road and off-road vehicle regulation in the context of all sectors and vehicle pollution control technology in general, but also very specifically on the prospects for a national lower NOx standard for heavy-duty engines.

In a perfect world, such a meeting would take place the morning of Friday, October 23rd (or sometime on Monday, October 26th as a second, less preferable option). But, I fully realize that this isn't a perfect world and schedules are hard to wrangle/predict. However, since the execs will be coming from far and wide, a couple of weeks of advance notice would be much appreciated.

Thanks for considering.

Christopher Miller, Partner

AJW, Inc.

2200 Wilson Blvd, Suite 310

Arlington, VA 22201-3352

202-296-8086 x7 desk

202-257-8691 cell

To: Atkinson, Emily[Atkinson.Emily@epa.gov]
Cc: Charmley, William[charmley.william@epa.gov]; Stewart, Gwen[Stewart.Gwen@epa.gov]
From: Stewart, Lori
Sent: Tue 9/29/2015 6:28:32 PM
Subject: FW: Meeting request - late October

Emily, here is the meeting request we discussed. Janet has agreed to schedule this. I believe we should include Chris, Bill Charmley, and Ben and OTAQ can add others if they'd like.
Thanks.

From: Chris Miller [mailto:cmiller@ajw-inc.com]
Sent: Wednesday, September 16, 2015 4:40 PM
To: Stewart, Lori; Grundler, Christopher
Cc: Chris Hessler; Charmley, William
Subject: Meeting request - late October

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Thanks for considering.

Christopher Miller, Partner

AJW, Inc.

2200 Wilson Blvd, Suite 310

Arlington, VA 22201-3352

202-296-8086 x7 desk

202-257-8691 cell

From: Adm13McCarthy, Gina
Location: Administrator's Office
Importance: Normal
Subject: HOLD for Ozone Calls
Start Date/Time: Mon 9/28/2015 7:00:00 PM
End Date/Time: Mon 9/28/2015 7:45:00 PM

******Please DO NOT forward this calendar invitation. You may “Accept” or “Decline” the invitation but DO NOT respond with questions or concerns. If you do have any questions or concerns about this invitation please contact the Scheduling Office at scheduling@epa.gov . ******

SCt: Arian Herckis
Ct: Micah Ragland - 202-564-7676

From: Atkinson, Emily

Location: Conference Code Participant Code Conference Code

Importance: Normal

Subject: Hearing Prep with OTAQ re: VW

Start Date/Time: Mon 9/28/2015 8:45:00 PM

End Date/Time: Mon 9/28/2015 9:15:00 PM

Monday call - VW

To: McCabe, Janet; Niebling, William; Grundler, Chris; Hengst, Ben; Belser, Even

To: Atkinson, Emily[Atkinson.Emily@epa.gov]
Cc: Hengst, Benjamin[Hengst.Benjamin@epa.gov]
From: Niebling, William
Sent: Thur 9/24/2015 1:27:27 PM
Subject: Monday call - VW

Emily – Janet would like to have a 30 min call on Monday with Chris, Ben, Even Belser, and anyone else they want to include, to discuss how she should respond if any VW questions come up at her Tuesday CPP/ozone hearing with Senate EPW. Do you mind finding a time? Thanks!

-Wm.

William L. Niebling

Office of Air and Radiation

U.S. Environmental Protection Agency

tel: 202.564.9616

fax: 202.564.1408

From: Atkinson, Emily
Location: WJC-N 5400
Importance: Normal
Subject: Meet with EEN (Confirmed)
Categories: Business, Blue Category
Start Date/Time: Fri 10/9/2015 3:00:00 PM
End Date/Time: Fri 10/9/2015 3:30:00 PM
RE: Mitch of EEN
FW: Methane Comment Delivery Drop

Mitch Hescox to deliver 90K methane comments

To: Enobakhare, Rosemary[Enobakhare.Rosemary@epa.gov]
Cc: Dennis, Allison[Dennis.Allison@epa.gov]
From: Atkinson, Emily
Sent: Tue 9/22/2015 6:34:59 PM
Subject: RE: Mitch of EEN

Hi Rosemary,

That week is busy because Janet is on travel two days to NACAA and the ADD's meeting and she has a hearing, but that being said we could squeeze him in on Tuesday, 10/6 at 2pm or Friday, 10/9 at 11am.

Let me know if either work on your end.

Emily

Emily Atkinson
Staff Assistant

Immediate Office of the Acting Assistant Administrator
Office of Air and Radiation, USEPA
Room 5406B, 1200 Pennsylvania Avenue NW
Washington, DC 20460
Voice: 202-564-1850
Email: atkinson.emily@epa.gov

From: Dennis, Allison
Sent: Tuesday, September 22, 2015 2:32 PM
To: Enobakhare, Rosemary
Cc: Atkinson, Emily
Subject: RE: Mitch of EEN

+ Emily. She'll know best!

From: Enobakhare, Rosemary
Sent: Tuesday, September 22, 2015 2:14 PM
To: Dennis, Allison
Subject: RE: Mitch of EEN

Hey Allison,

Would it be possible to find time for Mitch to meet with Janet the week following Ozone (October 5th – 9th)? The meeting wouldn't have to be long, maybe 15 minutes. He's looking to deliver 90K methane comments to her. Let me know what Janet has available that week.

Thanks,

Rosemary

From: Ragland, Micah
Sent: Monday, September 21, 2015 5:58 PM
To: Dennis, Allison
Cc: Enobakhare, Rosemary
Subject: RE: Mitch of EEN

Hey Allison, I think this is a really good suggestion, let me run it by Mitch and as soon as I get an answer I will follow-up with you. Thx, Micah

From: Dennis, Allison
Sent: Monday, September 21, 2015 3:02 PM
To: Ragland, Micah
Subject: Mitch of EEN

If Mitch is interested, we can see if Sarah Dunham (OAP) and Jerry Lawson of E* are available

to meet on 10/1.

Regarding not being able to meet, he should know, and there's no reason not to tell him, that we expect to be announcing ozone that day, so Janet's time is just really unpredictable that day. Hopefully he understands!

From: Atkinson, Emily
Location: WJC-N 5400
Importance: Normal
Subject: Meet with Brian Wolff, Pat V Collawn and Greg Abel (Confirmed)
Categories: Business, Blue Category
Start Date/Time: Fri 9/25/2015 4:30:00 PM
End Date/Time: Fri 9/25/2015 5:00:00 PM

Re: Joe

Confirmed: 9/25 at 12:30pm with Janet McCabe and Joe Goffman

To: McCabe, Janet; Goffman, Joe; Jordan, Debbie

Outside Attendees (in person): Brian Wolff, Pat V Collawn and Greg Abel

To: Wolff, Brian[BWolff@eei.org]
Cc: Goffman, Joseph[Goffman.Joseph@epa.gov]
From: Atkinson, Emily
Sent: Mon 9/21/2015 3:08:20 PM
Subject: Confirmed: 9/25 at 12:30pm with Janet McCabe and Joe Goffman

Hi Brian,

You are confirmed for a 20 minute meeting on Friday, September 25 at 12:30pm with Janet McCabe and Joe Goffman.

Directions and procedures to 1200 Pennsylvania Avenue NW:

Metro: If you come by Metro get off at the Federal Triangle metro stop. Exit the metro station and go up two sets of escalators to the surface level and turn right. You will see a short staircase and wheelchair ramp leading to a set of glass doors with the EPA logo - that is the William Jefferson Clinton Federal Building, North Entrance.

Taxi: Direct the taxi to drop you off on 12th Street NW, between Constitution and Pennsylvania Avenues, at the elevator for the Federal Triangle metro stop - this is almost exactly half way between the two avenues on 12th Street NW. Facing the building with the EPA logo and American flags, walk toward the building and take the glass door on your right hand side with the escalators going down to the metro on your left – that is the North Lobby of the William Jefferson Clinton building.

Security Procedures: A government issued photo id is required to enter the building and it is suggested you arrive 15 minutes early in order to be cleared and arrive at the meeting room on time. Upon entering the lobby, the meeting attendees will be asked to pass through security and provide a photo ID for entrance. Let the guards know that you were instructed to call 202-564-7404 for a security escort.

Please feel free to contact me should you need any additional information.

Emily

Emily Atkinson
Staff Assistant
Immediate Office of the Acting Assistant Administrator
Office of Air and Radiation, USEPA
Room 5406B, 1200 Pennsylvania Avenue NW
Washington, DC 20460
Voice: 202-564-1850
Email: atkinson.emily@epa.gov

-----Original Message-----

From: Wolff, Brian [mailto:BWolff@eei.org]
Sent: Monday, September 21, 2015 11:01 AM
To: Atkinson, Emily
Cc: Goffman, Joseph; Wolff, Brian
Subject: Re: Joe

Yes thanks
Will get attendees today

Sent from my iPhone

> On Sep 21, 2015, at 7:47 AM, Atkinson, Emily <Atkinson.Emily@epa.gov> wrote:
>
> Hi Brian,
>
> It looks like Janet and Joe could be available for a 20 minute meeting on Friday, September 25
at 12:30pm. Let me know if this could work on your end.
>
> Thanks.
> Emily
>
> Emily Atkinson
> Staff Assistant
> Immediate Office of the Acting Assistant Administrator Office of Air
> and Radiation, USEPA Room 5406B, 1200 Pennsylvania Avenue NW
> Washington, DC 20460
> Voice: 202-564-1850
> Email: atkinson.emily@epa.gov
>
> -----Original Message-----
> From: Goffman, Joseph
> Sent: Saturday, September 19, 2015 4:33 PM
> To: Wolff, Brian
> Cc: Atkinson, Emily
> Subject: Re: Joe
>
> Hi, Brian. Emily will help on the scheduling.
>
> Thanks re dinner. Your question about my plans for Wednesday evening is one of of first
impression as a court would put. At the moment I have no plans.
>
> - Joseph Goffman
> Sent from my iPhone
>
>> On Sep 19, 2015, at 9:10 AM, Wolff, Brian <BWolff@eei.org> wrote:
>>
>>
>> We are going to go to the WH next Friday on Ozone. Id like to bring Pat V Collawn and Greg
Abel by EPA following that. Could you and Janet meet for 20 min around noon on 25th? I am
trying to just get ahead of the final rule the following week and this would just be a courtesy and
make their trip worthwhile.
>>
>> Thanks much.
>>
>> Also, ill be in NY next week for Climate week. Are we seeing you for dinner on Weds? Hope
so.

From: Rupp, Mark
Location: Alm Conference Room
Importance: Normal
Subject: Ozone Briefing with RAs
Start Date/Time: Wed 9/30/2015 8:30:00 PM
End Date/Time: Wed 9/30/2015 9:30:00 PM

From: Atkinson, Emily

Location: WJC-N 5400 + Conference Code Participant Code Conference Code

Importance: Normal

Subject: Ozone Roll Out Discussion

Start Date/Time: Fri 9/25/2015 3:00:00 PM

End Date/Time: Fri 9/25/2015 3:30:00 PM

To: McCabe, Janet; Jordan, Debbie; Blumenfeld, Jared; Davis, Alison; Koerber, Mike; Millett, John; Adams, Elizabeth

From: Atkinson, Emily
Location: WJC-N 5400 + Conference Code, Participant Code: Conference Code
Importance: Normal
Subject: 1:1 CPP call with Indiana (Confirmed)
Categories: Green Category
Start Date/Time: Tue 9/15/2015 6:00:00 PM
End Date/Time: Tue 9/15/2015 6:15:00 PM
Assigned Qs for Indiana Call 0918.docx
Re: Questions for IN State Call, September 15
FW: Questions for IN State Call, September 15

Janet would plan to join for the first 15 minutes.

To: Dennis, Allison[Dennis.Allison@epa.gov]
Cc: Atkinson, Emily[Atkinson.Emily@epa.gov]; Goffman, Joseph[Goffman.Joseph@epa.gov]
From: McCabe, Janet
Sent: Fri 9/11/2015 4:15:28 AM
Subject: Re: Questions for IN State Call, September 15

Thanks for asking. I really would like to be able to be there at the start of the call--maybe for 10-15 minutes if we can swing it. If we can make it work, we should let the IDEM folks know I'll have to leave early but wanted to be on for a few minutes at least.

Their list of questions is really good--they're clearly putting some thought into it.

Sent from my iPhone

On Sep 10, 2015, at 7:26 PM, Dennis, Allison <Dennis.Allison@epa.gov> wrote:

The programs are having their 1:1 CPP call with Indiana next Tuesday from 2-3. They'd like to see if you want to be included in any way. FYI: You are already booked during that time w/an internal mtg on CA Ozone followed by another internal mtg on TX/OK Regional Haze.

From: Noonan, Jenny
Sent: Thursday, September 10, 2015 5:05 PM
To: Dennis, Allison
Cc: Bunte, Laura; Stevens, Gabrielle; Santiago, Juan; Koerber, Mike; Wilson, Erika; Culligan, Kevin; Johnson, Tanya
Subject: FW: Questions for IN State Call, September 15

Allison –

The Indiana CPP individual state call is occurring on Tuesday, 9/15 from 2-3pm. Does Janet want to participate in any way?

Gabrielle Stevens is the POC for this meeting and can provide more details if needed (it is also on the CPI). Attached is the list of question the State has sent in advance, and as you can see, they are detailed. We are working to ensure that we have the appropriate senior level staffing for this meeting from OAP and OAQPS and knowing if Janet is planning to be

there will help us sort out coverage.

Thanks,

Jenny

From: Stevens, Gabrielle

Sent: Wednesday, September 09, 2015 1:02 PM

To: Adamantiades, Mikhail; Santiago, Juan; Sherry, Christopher; Meroney, William; Sims, Ryan; Hight, Cate; Sherry, Christopher; Eschmann, Erich; Vijayan, Abi; Victor, Meg; Conlin, Beth

Cc: Noonan, Jenny; Wilson, Erika

Subject: Questions for IN State Call, September 15

Hello All: Attached please find the Qs from IN for their state call with EPA next Wednesday, September 15 at 2 pm.

Please advise if you have any objections to your assignment.

Many thanks, Gabrielle

Gabrielle Stevens

U.S. Environmental Protection Agency

Office of Air and Radiation

Office of Atmospheric Programs

Clean Air Markets Division

Program Development Branch

202-343-9252

<Assigned Qs for Indiana Call_0918.docx>

From: Atkinson, Emily

Location: WJC-N 5400 + Video with RTP + **Conference Code** Participant Code: **Conference Code**

Conference Code

Importance: Normal

Subject: EPW Hearing Prep: Ozone

Start Date/Time: Thur 9/24/2015 2:00:00 PM

End Date/Time: Thur 9/24/2015 3:00:00 PM

September 29th EPW CPP hearing prep meetings with Janet

RE: 9/24 hearing prep

To: Terry, Sara; Ashley, Jackie; Bailey, KevinJ; Lewis, Josh; Friedman, Kristina; Niebling, William; Lubetsky, Jonathan; Cyran, Carissa; Page, Steve; Santiago, Juan; Noonan, Jenny; Jordan, Deborah; Sasser, Erika; Mathias, Scott; Wesson, Karen; Weatherhead, Darryl; Scavo, Kimber; Hemby, James; Dolwick, Pat

Cc: Keating, Martha; Wayland, Richard; Davis, Alison; Koerber, Mike

To: Niebling, William[Niebling.William@epa.gov]; Atkinson, Emily[Atkinson.Emily@epa.gov]
Cc: Lubetsky, Jonathan[Lubetsky.Jonathan@epa.gov]; Cyran, Carissa[Cyran.Carissa@epa.gov]
From: Ashley, Jackie
Sent: Thur 9/17/2015 7:04:46 PM
Subject: RE: 9/24 hearing prep

Please add the following names to the 9/24 EPW hearing prep session from 10 am to 11 am.

Erika Sasser

Scott Mathias

Karen Wesson

Darryl Weatherhead

Kimber Scavo

James Hemby

Pat Dolwick

CC

Martha Keating

Chet Wayland

Alison Davis

Mike Koerber

Jackie Ashley - US EPA - Office of Air Quality Planning and Standards - 919-541-7664 – ashley.jackie@epa.gov

From: Niebling, William
Sent: Wednesday, September 16, 2015 2:37 PM
To: Atkinson, Emily
Cc: Ashley, Jackie; Lubetsky, Jonathan; Cyran, Carissa
Subject: 9/24 hearing prep

Emily – would you please add Debbie to all four hearing prep sessions next week (but not this Friday's)? In addition, for the 9/24 session: the topic will be ozone; Jackie will send you some names to add; and you can remove Joe, CPI, Reid, Kevin, and Peter.

Thanks!

-Wm.

William L. Niebling

Office of Air and Radiation

U.S. Environmental Protection Agency

tel: 202.564.9616

fax: 202.564.1408

From: Atkinson, Emily
Location: Hunton & Williams LLP, 2200 Pennsylvania Ave
Importance: Normal
Subject: Keynote at the ALI- CLE Clean Air Act Conference (Confirmed)
Categories: Green Category
Start Date/Time: Thur 10/22/2015 1:00:00 PM
End Date/Time: Thur 10/22/2015 1:45:00 PM
FW: ALI-CLE Program on Clean Air Act October 23 1:30 to 2:30 pm
Janet McCabe Event Form.docx

To: McCabe, Janet; Jordan, Debbie; Drinkard, Andrea

Event Information Form

This form has been designed to assist in planning participation in events and activities.
This is not a confirmation of DAA Janet McCabe's attendance.

Basic Background

Name of Event	The Clean Air Act: Directions in Law, Policy, and Practice (2015)
Sponsoring Organization	American Law Institute
Date of Event	October 22-23, 2015
Time of Event	All Day
Expected time of remarks or participation by DAA McCabe	1:30 – 3 pm on October 22 (Shaw or McCabe) 1:30 – 2:30 pm on October 23 (McCabe)
Location (please include city/town and street address)	Washington, D.C. [Hunton & Williams LLP] Live Video Webcast
Directions to the event (if appropriate, please also include relevant information about parking, the specific building, and best entrance to use)	The course will be held at Hunton & Williams LLP, 2200 Pennsylvania Ave. NW Washington, DC 20037 (202) 955-1500, [replace if traveling by car, there is a parking garage under the building, accessed by the entrance on 11 th Street. If traveling by metro, the following stations are within close walking distance to the office: Red Line (Metro Center or Gallery Place/Chinatown stops), Orange/Blue Lines (Metro Center or Archives-Navy Memorial stops), or Yellow/Green Lines (Archive-Navy Memorial or Gallery Place/Chinatown stops).]
Where to meet POC	

Event Description and Role of the DAA

Brief description or outline of the event	Annual Clean Air Seminar.
Brochure, invitation and/or other event material(s)	http://www.ali-cle.org/index.cfm?fuseaction=courses.course&course_code=CX014
Agenda and order of speakers and biography/information of other speakers	Shaw/McCabe will be primary speakers on panels. For NAAQS panel, Tad Aburn (Maryland) is also invited.
Name of person introducing DAA McCabe	Byron Taylor/Jonathan Martel depending on panel
Basic information about the role of the DAA official at the event. (For example, will they serve as a keynote speaker? Participate on a panel? Take part in a press conference? Tour a facility?)	Panel discussions
If the DAA official is a featured speaker, which topic(s) should they address and how long?	October 22: NAAQS issues October 23: Open Q&A Session
What rules would the audience	CSAPR, ozone transport, PM implementation.

like to hear about?	EPA priorities.
Will there be time for Q&A? If so, who will be moderating?	Yes. Byron Taylor, Jonathan Martel
Do you have a sense of the types of questions that may be asked?	Audience is broadly made up of private practitioners, in-house counsel, consultants, various state and federal agencies, military representatives, and reporters. Questions, therefore, are likely to be varied.
Recommendations on the use of visuals/PowerPoint. Should the DAA official plan on using a PowerPoint Presentation?	PowerPoint preferred.
What is the physical layout of the room (e.g. size, and format of the interaction; podium, seated in armchair dialogue, or at a table, etc.)	Podium and a head table

About the Audience

Please tell us about the make-up of the audience for the event:	
Expected number in attendance at the event	Approx. 60-100
Will it be largely members of your organization?	N/A. Open to public
Will others be in attendance? If so, who will be at the event? (General public, Businesspeople, Educators, Families, Students – what grade level, Children – how old)	See above. No children.
Others? (Please describe)	
Is the event open to press?	Yes.

Contact Information

Your name:	Byron F. Taylor	Jonathan Martel
Telephone Number:	312-853-4717	202.942.5470
Mailing Address:	Sidley Austin, LLP One South Dearborn Street Chicago, IL 60603	555 Twelfth Street, NW Washington, DC 20004
E-Mail Address:	bftaylor@sidley.com	jonathan.martel@aporter.com
Cell Phone Number:	708-359-2346	
Fax Number:	312-853-7035	
Best way to reach you at the event?	Cell	

EPA Contact Person

Emily Atkinson, Administrative Assistant to Janet McCabe: 202-564-7403

Andrea Drinkard, Public Affairs Specialist: 202-564-1601

To: Argyropoulos, Paul[Argyropoulos.Paul@epa.gov]; Wood, Anna[Wood.Anna@epa.gov]; Iglesias, Ariel[Iglesias.Ariel@epa.gov]; Arnold, Anne[Arnold.Anne@epa.gov]; Jefferson, Catrice[Jefferson.Catrice@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Fernandez, Cristina[Fernandez.Cristina@epa.gov]; McCarthy, Gina[McCarthy.Gina@epa.gov]; McCabe, Janet[McCabe.Janet@epa.gov]; Filippelli, John[Filippelli.John@epa.gov]; Mathias, Scott[Mathias.Scott@epa.gov]; Koerber, Mike[Koerber.Mike@epa.gov]; Page, Steve[Page.Steve@epa.gov]; Harvey, Reid[Harvey.Reid@epa.gov]; Ruvo, Richard[Ruvo.Richard@epa.gov]; Kapichak, Rudolph[kapichak.rudolph@epa.gov]; Wayland, Richard[Wayland.Richard@epa.gov]; Banister, Beverly[Banister.Beverly@epa.gov]; Newton, Cheryl[Newton.Cheryl@epa.gov]; Conroy, David[Conroy.Dave@epa.gov]; Esher, Diana[Esher.Diana@epa.gov]

From: Kromeklia Bryant

Sent: Wed 4/13/2016 8:26:35 PM

Subject: Invitation: OTC/MANE-VU Spring Meeting in Philadelphia, PA on June 3, 2016

[removed.txt](#)

[image002.emz](#)

Connecticut

April 13, 2016

Delaware

District of Columbia

Dear EPA Members of OTC and EPA Staff:

Maine

Maryland

Massachusetts

New Hampshire

New Jersey

New York

Pennsylvania

Rhode Island

Vermont

Virginia

I hope that you will be able to attend the 2016 OTC/MANE-VU Spring Meeting being held on Friday, June 3rd at the Hotel Palomar located at 117 South 17th Street, Philadelphia, PA 19103. The OTC/MANE-VU Spring Meeting will be held from 9:30 am to 4:00 pm. Lunch will be served to meeting attendees who have paid the registration fee.

The hotel's room rate is \$168 per night. Please use this link to make reservations

<https://gc.synxis.com/rez.aspx?Hotel=26754&Chain=10179&Dest=PHILLY&locUS&arrive=6/1/2016&depart=6/3/2016&adult=1&child=0&group=17800703810>

The OTC room block cut-off date is **Monday, May 2nd**.

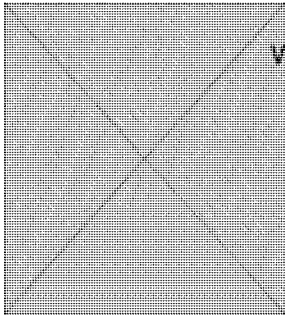
The registration fee for the four EPA members of the OTC will be waived. We ask that all EPA attendees please register for planning purposes. The registration Deadline is Monday, May 30, 2016. Attached for your convenience are the agenda and hotel and travel information.

David C. Foerter
Executive Director

444 N. Capitol St. NW
Suite 638
Washington, DC
20001
(202) 508-3840
FAX (202) 508-3841
Email:
ozone@otcair.org

Registration/check-in will begin on June 3rd at 8:00 am, and the meeting will convene at 9:30 am. A draft meeting agenda is attached for your information. Please note that we have scheduled an Executive Session between the OTC state members and senior EPA managers only on June 3rd from 8 am to 9:15 am.

We invite the EPA members of the OTC (four official member representatives, including one each from EPA Headquarters/OAR and Region I, II and III offices) to sit at the table; all other EPA participants are invited to sit in the gallery with our other stakeholders and guests. Meeting materials will be emailed to the offices of each EPA member: Assistant Administrator Janet McCabe (EPA/OAR), Regional Administrators, Curt Spalding (EPA Region I), Judith Enck (EPA Region II), and Shawn M. Garvin (EPA Region III) and their designees.



We ask that each EPA office notify Kromeklia Bryant (by phone at 202-508-3840 or via email at kbryant@otcair.org) who will be attending in the members' capacity, especially where the EPA member has designated someone else to attend in his/her place. We will be making tent cards for the EPA members seated at the table and nametags for all attendees, so we will appreciate knowing this information in advance of the meeting.

EPA participants other than the four official OTC members or their designees have the option of paying the \$150 registration fee or attending as a member of the public. The meeting registration fee helps to cover the cost of the meeting facility and breaks, and entitles payees to meeting materials and lunch. If you are not an EPA member of OTC but only wish to have the meeting materials and not attend the lunch, you can purchase the materials at the meeting registration desk for a fee of \$20.00, payable by cash or check.

Please let us know if you have any questions.

Hope to see you there!

David C. Foerter

Executive Director

Ozone Transport Commission

Connecticut

Delaware

District of Columbia

Maine

Maryland

Massachusetts

New Hampshire

New Jersey

New York

Pennsylvania

Rhode Island

Vermont

Virginia

David C. Foerter
Executive Director

444 N. Capitol St. NW
Suite 638
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20001
(202) 508-3840
FAX (202) 508-3841
Email:
ozone@otcair.org

Connecticut

Delaware

District of Columbia

Maine

Maryland

Massachusetts

New Hampshire

New Jersey

New York

Pennsylvania

Rhode Island

Vermont

Virginia

David C. Foerter
Executive Director

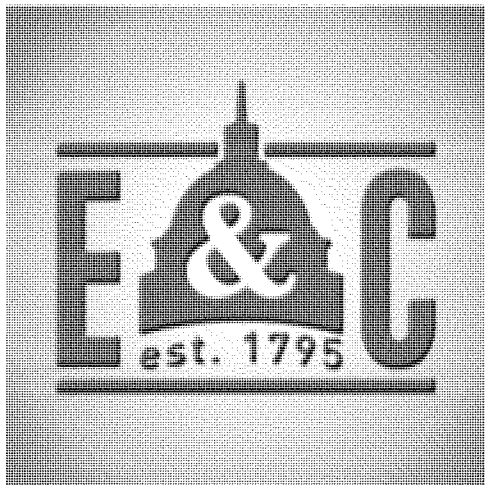
444 N. Capitol St. NW
Suite 638
Washington, DC
20001
(202) 508-3840
FAX (202) 508-3841
Email:
ozone@otcair.org

To: Jed Anderson[jedanderson@jedlaw.net]
From: Jed Anderson
Sent: Wed 4/13/2016 8:24:54 PM
Subject: Tomorrow's Congressional Hearing on Ozone and the Clean Air Act

FYI

From: Jed Anderson [mailto:jedanderson@jedlaw.net]
Sent: Wednesday, April 13, 2016 3:19 PM
To: CAA Reform Distribution List

Subject: Tomorrow's Congressional Hearing on Ozone and the Clean Air Act



Tomorrow's Congressional Hearing on Ozone and the
CAA

Hopefully everyone can watch tomorrow's Congressional hearing on ozone and the Clean Air Act: see <https://energycommerce.house.gov/hearings-and-votes/hearings/hr-4775-ozone-standards-implementation-act-2016>. I want to thank everyone who will be participating and helping with the hearing tomorrow. I will be thinking of you and wishing you the very best.

Here is what was said last time by the States in the 2012 E&C Clean Air Act forums. And below

are some pictures/comments from the Congressional witnesses and others who have previously shared concerns about the Clean Air Act's environmental and economic effectiveness as we move further into a 21st century world.

- State of Arkansas: **“The SIP process is badly in need of reform. The present process is overly cumbersome, slow and bureaucratic.”**
- State of Ohio: **“The State Implementation Plan process has become burdensome and overly complicated.”**
- State of Colorado: **“SIPs and other demonstration packages from states are only getting more voluminous and complex, often without concurrent air quality benefits.”**
- San Joaquin Valley Air Pollution Control District: **“The current regiment [the NAAQS/SIP Process] leads to a great deal of redundancy, overlap, and confusion.”**
- State of South Carolina: **“We are particularly concerned about the state implementation plan (SIP) process [. . .]”**
- State of Texas: **“While states are responsible for achieving the NAAQS through the SIP process, the authority to achieve the ozone NAAQS arguably now lies with the federal government. The nonalignment between responsibility and authority is a primary issue that needs to be considered in reform of the Clean Air Act.”**
- South Coast Air Quality Management District: **“The current Clean Air Act places all the responsibility on the states, but then deprives them of the needed authority through preemption provisions. This is not a fair situation. If USEPA has the sole authority, it must also have the responsibility.”**
- City of Houston: **“[T]he SIP process has been problematic for local governments . . .”**
- State of Montana: **“[N]ot all aspects of the CAA have been implemented in a manner that allows us to keep pace with the changes in air quality management. An example of this is the State Implementation Plan (SIP) process. [. . .]”**
- State of Indiana: **“The SIP revision approval process is not predictable or timely.”**
- State of New Hampshire: **“[O]ften states are working on SIPs for multiple pollutants for which EPA had established different compliance deadlines.”**
- State of Arizona: **“Often times, action on SIPs deemed unimportant is delayed, for as much as 20 years.”**
- Dayton County Regional Air Pollution Control Agency: **“Addressing the SIP in the various forms of approval within permit conditions is difficult and confusing. Improvement is needed and can be accomplished only through simplification of the process within the**

CAA legislation.”

- SIP Transformation Workgroup: “The SIP process worked 40 years ago when the Clean Air Act was written, but circumstances have since changed. Our understanding has since changed. The world has since changed. It’s time to develop a more efficient, effective, and less costly air quality management process to guide our nation’s future.”

---“Our environmental laws badly need re-thinking.”

WILLIAM RUCKELSHAUS
FIRST ADMINISTRATOR OF THE EPA

---“[We need] a more robust statutory framework to enable the country to achieve further environmental progress, which at the moment is stalled and needs to be rekindled.”
—William K. Reilly, Administrator, U.S. Environmental Protection Agency, 1989-93

“We ought to be able to go further, but we can’t because the statute is stupid.”

David Schoenbrod

---“The Clean Air Act is not a relic to be displayed in the Smithsonian, but a living document that must be refurbished to continue realizing results. . . . [W]e have a responsibility to overhaul and enhance the Clean Air Act to ensure it translates from paper promises into cleaner air.”
—Stephen Johnson, Former EPA Administrator

"Ozone is a global issue."

"The way that we deal with ozone today just no longer makes any sense."

—Jeff Holmstead, Bracewell & Giuliani Partner, EPA Assistant Administrator for Air, Congressional Testimony 10/23/14

MR. HOLMSTEAD

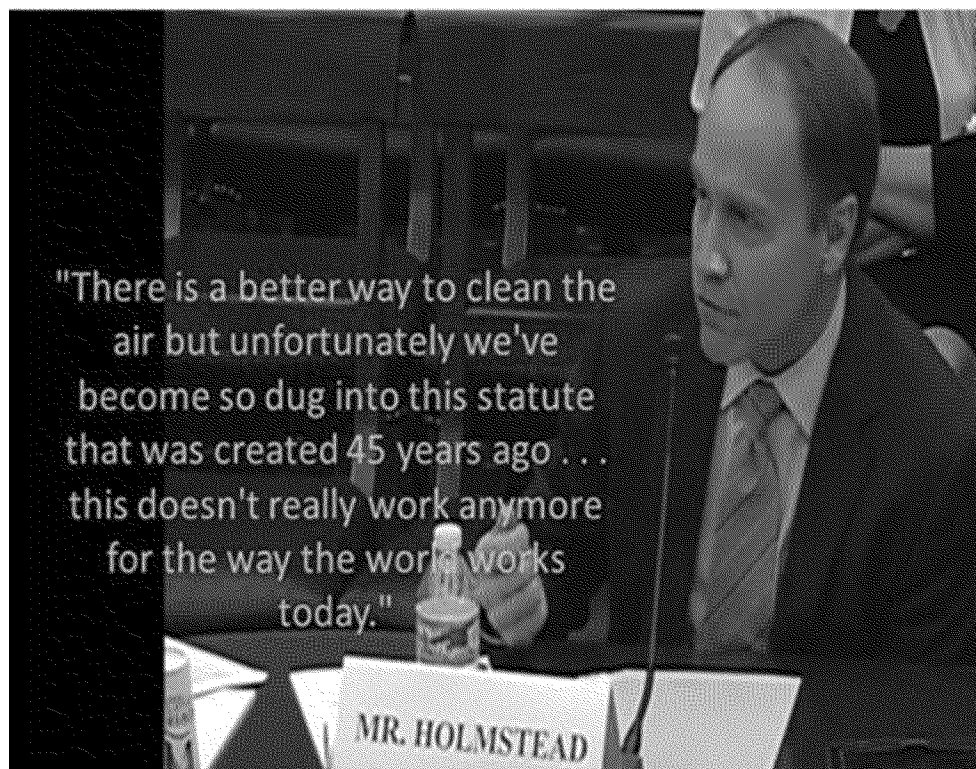
"The level the industry is getting closer and closer to where blowing in the ocean."

"To control pollution, America has need to think globally."

"We believe the world is a different world today compared to 25 years ago when the Congress last amended the Act or 40 years ago when the Congress passed the Act."

U.S. C
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—Daniel Jacob, Harvard
E&E News, 11/17/14



"There is a better way to clean the air but unfortunately we've become so dug into this statute that was created 45 years ago . . . this doesn't really work anymore for the way the world works today."

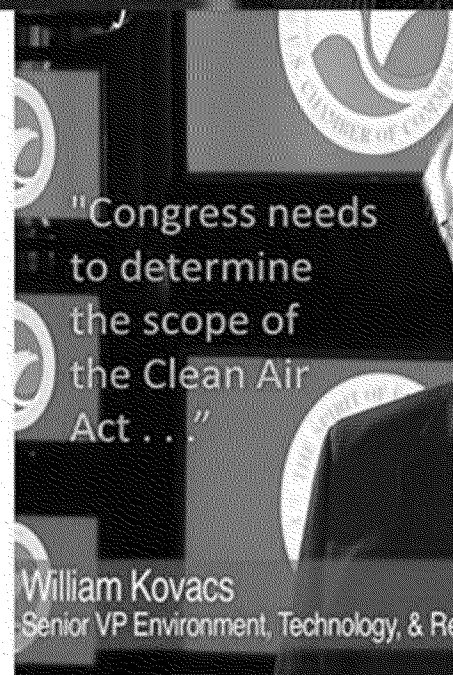


—"The heart of the Clean Air Act pollutants is a top-down command adopted thirty-eight years ago to update the law on the basis improve health protection, save technological innovation," —Richard the Environmental Defense Fund, and former EPA

—"We implore members of Congress from both sides of the aisle to work together toward a more modern federal air regulatory system."

—"It is time for Congress to take a serious look at modernizing the Clean Air Act."

NATIONAL ASSOCIATION OF
Manufacturers



"Congress needs to determine the scope of the Clean Air Act . . ."

William Kovacs
Senior VP Environment, Technology, & R

The world is changing. We must change with it. Time to transform the Clean Air Act. We can make it happen.

To: McCabe, Janet[McCabe.Janet@epa.gov]
From: Ashley, Jackie
Sent: Sat 4/9/2016 9:00:56 PM
Subject: Automatic reply: Ozone testimony

I am out of the office. If you need immediate assistance, please contact Sara Terry.

To: McCabe, Janet[McCabe.Janet@epa.gov]
From: Lubetsky, Jonathan
Sent: Sat 4/9/2016 9:00:55 PM
Subject: Automatic reply: Ozone testimony

I will be out of the office starting March 21, 2016 and returning on April 11, 2016. After March 28th, I will be checking and responding to email at least once a day. Please contact Tamara Saltman or William Niebling (congressional coordination issues), Carissa Cyran (congressional letters) or Larry Weinstock (document productions) for further assistance. If you need a more immediate response, please contact Tamara Saltman.

To: McCabe, Janet[McCabe.Janet@epa.gov]
From: Dan Greenbaum
Sent: Thur 4/7/2016 9:17:11 PM
Subject: Be Sure Not To Miss the Chance to Sign Up for HEI's Annual Conference!

Dear Colleague,

Just a brief reminder about the upcoming HEI Annual Conference in Denver from May 1-3, 2016.

Time is running out! We hope you will register today if you haven't done so already.

We have an exciting set of sessions planned, and a detailed program and poster abstracts are now available at www.healtheffects.org/annual.htm.

In addition to posters from all HEI-funded studies, we are welcoming additional posters to complement the plenary sessions, including some from the local Denver area.

We look forward to an exciting program. In a nutshell:

- A keynote lecture by Dr. Christopher Murray
- Six plenary sessions
 - o Air Pollution, Climate, and Health
 - o Low Levels of Air Pollution
 - o Global Burden of Disease
 - o Cardiovascular Effects of Ozone
 - o Traffic-Related Air Pollution
 - o and an update on HEI's Research Programs
- Two poster sessions
- A pre-conference workshop "Demystifying Casual Inference Methods for Air Pollution Epidemiology"

We hope to see you in Denver in May.

Best wishes,

Dan Greenbaum

President

From: Anderson, Denise
Location: DCRoomARN3530CFTB/DC-Ariel-Rios-AO
Importance: Normal
Subject: ECOS Meeting Pre-Brief
Start Date/Time: Thur 4/7/2016 8:00:00 PM
End Date/Time: Thur 4/7/2016 8:45:00 PM
Annotated Agenda ECOS 2016 Spring Mtg 4-06-16.docx

Call In #	Conference Code	Code	Conference Code
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Point of Contact for the Meeting:

Mark Rupp 202-564-6074, staff Ct:
Andrea Barbery, 202-564-1397
SCt: Denise Anderson, 202-564-1782

Purpose: Mark Rupp, OCIR, will run through the agenda for the ECOS Spring Meeting (April 10-13) for senior leaders' situational awareness. This meeting will also serve as an opportunity for ECOS meeting attendees to coordinate on messaging and ask questions about content and logistics of the meeting.

Role of the Administrator: The Administrator will be featured in two sessions on Wed., Apr. 13: from 8:00 - 9:15 a.m., she will participate in a moderated Q&A session with ECOS President Martha Rudolph, and from 9:30 - 10:30 a.m., YOU and she will speak at a closed (state-EPA only) session on working together through crisis.

Role of Deputy Administrator: YOU will attend the entire ECOS Spring meeting, with speaking roles in the 9:30 - 10:30 a.m. closed session on Wed., Apr. 13, as well as the Federal Facilities Forum later on the afternoon of Wed.,

EPA Staff (Required):

- Teresa Marks
- Janet McCabe
- Andy Battin

Apr. 13, and E-Enterprise Session on Wed - Thurs (13th - 14th).

Background: ECOS holds 3 key meetings every year: a Spring Meeting, a State Environmental Protection (STEP) Meeting in the summer, and a Fall meeting. In recent years, new leadership at EPA and ECOS has fostered a strong partnership between federal and state environmental leaders. These meetings are well-attended by state environmental commissioners and EPA leadership, as well as federal agency partners, industry, academia, and others. The 2016 Spring Meeting will focus on Public Health, with the Administrator slated to participate in a two sessions on Wednesday, April 13. Over 200 people are registered, including over 30 EPA senior leaders and staff.

Last possible date for the meeting: Friday, April 8 (meeting begins Sunday, Apr. 10)

Is the meeting urgent and if so why?: The meeting is not urgent but because so many AAs and RAs attend, it is helpful for all EPA participants to be on the same page with respect to meeting objectives, messages, etc.

Requested Time Length: 30 min

- Mark Rupp
- Mike Osinski
- Andrea Barbery

- Cynthia Giles
- David Hindin
- Kay Holt
- Avi Garbow
- Mathy Stanislaus
- Nitin Natarajan
- Barry Breen
- Jackie Harwood
- Sandra Connors
- Tom Burke
- Lisa Matthews
- Elizabeth Corona

- Joel Beauvais
- Curt Spalding
- Shawn Garvin
- Heather McTeer Toney
- Anne Heard
- Cheryl Newton
- Sam Coleman
- Mark Hague
- Joan Card
- Shaun McGrath
- Michelle Pirzadeh

EPA Staff (Optional):

- Chris Knopes
- Allison Dennis
- Stacey Sublett
- Ragan Tate
- Nick Hilosky
- Kelley Smith
- Karen Gude
- Kendra Tyler
- Linda Miller
- Shea Jones Johnson

The Environmental Council of the States
2016 Spring Meeting: *Pathways to Partnerships: Advancing Environmental Protection*

Sunday, April 10 – Wednesday, April 13, 2016
Music City Center
Nashville, Tennessee

Followed by Meeting of the E-Enterprise for the Environment Leadership Council
Wednesday, April 13 – Thursday, April 14, 2016

Notes:

- (1) Twitter users are encouraged to use #ECOSpringMtg16 to tweet about the meeting.
- (2) Dress for the meetings is business casual.
- (3) All meeting space is located on the main level of the Music City Center
- (4) Draft resolutions will be posted near the registration desk.
- (5) All meetings are open to all registrants, including press, except where indicated.

Sunday, April 10th – OPEN TO ALL ATTENDEES**[5:30 – 8:30 p.m.] After-Hours Tour, Buffet Dinner, and Musical Entertainment**
Country Music Hall of Fame and Museum (222 5th Ave. South)

The Country Music Hall of Fame and Museum adjoins the Omni Nashville Hotel lobby. From the Omni, pass the concierge desk to the Hall of Fame lobby where guests will be directed to the museum elevators. No tickets or identification are needed. Guests may tour the museum until 7:30 p.m. and visit the souvenir shops until 6:00 p.m. or return to the shops during the meeting. In the first floor Conservatory, a cash bar opens at 6:00 p.m., buffet dinner is served at 6:30 p.m., and a seated musical performance begins at 7:30 p.m.

Monday, April 11th – OPEN TO ALL ATTENDEES UNTIL 4:00 P.M.**[7:30 – 8:45 a.m.] Continental Breakfast**
103 A-B**[7:30 – 8:45 a.m.] The ECOS Shale Gas Caucus**
103 C

After focusing initially on air and methane issues, the SGC now adds water to its portfolio. The caucus kicks off this work with a discussion of "What Commissioners Need to Know about Alternative Management Strategies for Water Produced from Oil and Gas Wells." A variety of state partners will participate. Continental breakfast may be taken into the session.

- Martha Rudolph of Colorado, ECOS President and SGC Co-Chair
- David Glatt of North Dakota, SGC Co-Chair
- Teresa Marks, AO
- Marni Lenahan, Energy Industry Analyst, U.S. Department of Energy
- Mike Smith, Executive Director, Interstate Oil and Gas Compact Commission
- Scott Anderson, Senior Policy Director, U.S. Climate and Energy Program, Environmental Defense Fund

- Roy Hartstein, Vice President, Strategic Solutions, Southwestern Energy Company

[9:00 – 10:30 a.m.] Opening Plenary Session

104 A-D

- Call to Order – Martha Rudolph of Colorado, ECOS President
- Host State Welcome – Nashville Mayor Megan Barry, introduced by Bob Martineau of Tennessee, ECOS Past President
- Self-introduction of ECOS Officers and Members
- Announcements and Agenda Preview – Martha Rudolph of Colorado
- Keynote Address on the Environment-Public Health Nexus by Bryn Barnard, author of *Outbreak! Plaques That Changed History*, introduced by Martha Rudolph of Colorado
- Preview of ECOS' New Website – Alexandra Dunn, ECOS Executive Director

[10:30 – 11:00 a.m.] Fresh Air Break, with Refreshments and Book Signing by Author Bryn Barnard

104 A-D Foyer

[11:00 a.m. – 12:15 p.m.] The Nexus between Environment and Public Health

104 A-D

This dynamic discussion will focus on techniques and approaches for enhancing partnerships between environmental regulators and public health professionals. Examples will be shared to show how decision-making and outcomes can be improved through these collaborations. The session will include the signing of a Memorandum of Agreement on Public and Environmental Health Initiatives by EPA, ECOS, and ASTHO.

- Martha Rudolph of Colorado, ECOS President
- Dr. Edward Ehlinger, Commissioner of Health, Minnesota Department of Health, and President, Association of State and Territorial Health Officials (ASTHO)
- Dr. Tom Burke, ORD
- Richard Oppen, Director, Montana Department of Public Health and Human Services, and former ECOS President

[12:15 – 1:30 p.m.] Keynote Lunch: Risk Communication and Response

103 A-B

Invited to sit at the head table during the lunch: Dr. Tom Burke

- Dr. Randall Hyer, Co-founder, CrisisCommunication.net, Deputy Director, Center for Risk Communication, and co-author of the World Health Organization handbook *Effective Media Communication during Public Health Emergencies*

[1:30 – 2:30 p.m.] Partnerships to Advance Air Quality: Focus on Ozone and Regional Haze

104 A-D

Under EPA's recent tightening of the NAAQS for ozone, state recommendations on nonattainment area designations are due in October. The Agency also plans to finalize a rule by the end of the year updating its regional haze program and already is taking local action in many states. This roundtable will center on strategies states are pursuing to address the new ozone NAAQS and regional haze requirements.

- Bryan Shaw of Texas, Air Committee Chair
- Janet McCabe, OAR

[2:30 – 3:15 p.m.] Featured Address: State-Army Corps of Engineers Relations**104 A-D**

- Major General Donald E. (Ed) Jackson Jr., Deputy Commanding General for Civil and Emergency Operations, U.S. Army Corps of Engineers

[3:15 – 3:30 p.m.] 2018 ECOS Spring Meeting Host State Selection**104 A-D**

Members will vote on a location for the 2018 ECOS Spring Meeting.

[3:30 – 4:00 p.m.] Fresh Air Break, with Refreshments**104 A-D Foyer****[4:00 – 5:00 p.m.] CLOSED SESSION: Resolutions, Bylaws Amendment, and Strategic Plan Voting****104 A-D**

Open to ECOS members and their staff and ECOS staff. (No EPA Participants).

[5:00 – 5:30 p.m.] CLOSED SESSION: ECOS Executive Committee**104 A-D**

Open to ECOS members and their staff and ECOS staff. (No EPA Participants).

Evening open for individually arranged dinners and Alumni Association dinner.

Tuesday, April 12th – OPEN TO ALL ATTENDEES

[6:15 – 8:30 a.m.] Optional Walking Tour

Radnor Lake State Natural Area (<http://tnstateparks.com/parks/about/radnor-lake>)

Led by Bob Martineau of Tennessee. See signup sheet and additional details on the bulletin board in the registration area. Transportation will be provided by the Tennessee Department of Environment & Conservation.

[7:30 – 9:00 a.m.] Continental Breakfast**103 A-B****[7:30 – 9:00 a.m.] CLOSED SESSION: Environmental Research Institute of the States Board Meeting****105 A**

Open to states and invited guests. A separate continental breakfast will be served in the session.

- David Paylor of Virginia, ERIS President
- Dr. Tom Burke, ORD
- Jennifer Orme-Zavaleta, ORD/NERL
- Lisa Matthews, ORD

[7:30 – 9:00 a.m.] CLOSED SESSION: ECOS Data Management Workgroup**103 C**

Open to states and invited guests. (No EPA Participants)

[9:00 – 10:15 a.m.] Restoring Urban Waters to Bring Economic and Environmental Vitality Downtown

104 A-D

This roundtable will feature partnerships working to restore urban waterways in cities around the country and will present transferable experiences for protecting human health and the environment.

- Sara Pauley of Missouri, Water Committee Chair
- Martin Suuberg, Commissioner, Massachusetts Department of Environmental Protection
- Joel Beauvais, OW
- Mekayle Houghton, Executive Director, Cumberland River Compact

[10:15 – 10:45 a.m.] Fresh Air Break, with Refreshments**104 A-D Foyer****[10:15 – 10:45 a.m.] Side-meeting of ECOS leaders and OW****105 A**

EPA to discuss drinking water issues with ECOS leaders.

- Joel Beauvais, OW
- Mark Rupp, OCIR
- Heather McTeer Toney & Anne Heard, Lead Region 4
- Sara Parker Pauley of Missouri, Water Committee Chair
- David Paylor of Virginia, Water Committee Vice Chair
- Martha Rudolph of Colorado, ECOS President (invited)
- John Stine of Minnesota, ECOS Vice President
- Todd Parfitt of Wyoming, ECOS Secretary-Treasurer
- Bob Martineau of Tennessee, ECOS Past President (invited)
- Alex Dunn, ECOS Executive Director

[10:45 a.m. – 12:00 p.m.] The Recovered Material Role in Sustainable Materials Management: Corporate Roundtable**104 A-D**

Representatives of industries at various stages of maturity – coal ash recycling, waste-to-energy, and forest products manufacturing – will spotlight strides in curbing waste streams and promoting air quality and renewable energy and discuss how states can partner in these initiatives. State and EPA experiences will be featured during a Q&A period.

- Todd Parfitt of Wyoming, Waste Committee Chair
- Thomas Adams, Executive Director, American Coal Ash Association
- Paul Gilman, Ph.D., Senior Vice President and Chief Sustainability Officer, Covanta
- Paul Noe, Vice President for Public Policy, American Forest & Paper Association
- Scott Thompson, Executive Director, Oklahoma Department of Environmental Quality, and Waste Committee Vice Chair
- Mathy Stanislaus, OLEM

[12:00 – 1:15 p.m.] Lunch with Regional Discussions**103 A-B**

State attendees should be seated at designated tables with their U.S. EPA Regional Administrators or Deputy Regional Administrators. All others may be seated at non-reserved tables.

- RAs and DRAs (no R2 table)
- Mark Rupp, OCIR (for R9 table)

[1:15 – 2:30 p.m.] How Lean is Your Machine?**104 A-D**

This roundtable will present results of ECOS' national inventory of state lean activities and offer case studies of transformative efforts at state environmental agencies. EPA will share lean work occurring across the Agency, often in partnership with states.

- John Mitchell of Kansas, Innovation and Productivity Committee Chair
- Misael Cabrera, Director, Arizona Department of Environmental Quality
- Cathy Stepp, Secretary, Wisconsin Department of Natural Resources
- Sandra Connors, OP/OSEM

[2:30 – 3:30 p.m.] Beyond Bean Counting: Measuring the Impact of Environmental Enforcement**104 A-D**

This roundtable will explore how federal and state agencies are measuring the environmental, public health, and worker safety results of enforcement actions. While number of actions brought, or penalty dollars collected, can serve as indicators of results, enforcement officials are employing new and more refined approaches to communicate why actions were brought and to quantify how the environment, the public, and even violating entities will be in better positions post enforcement action. The roundtable also will show how private environmental governance approaches are supplementing state and federal enforcement activities.

- Ryan Flynn of New Mexico, Compliance Committee Chair
- John Cruden, Assistant Attorney General, Environment and Natural Resources Division, DOJ
- Cynthia Giles, OECA
- Michael Vandenberg, David Daniels Allen Distinguished Chair of Energy, Environment and Land Use Program, Vanderbilt University School of Law

[3:30 – 4:00 p.m.] Fresh Air Break, with Refreshments**104 A-D Foyer****[4:00 – 5:00 p.m.] The Clean Power Plan: What's Next****104 A-D**

After the U.S. Supreme Court stay of Clean Power Plan implementation and as the D.C. Circuit reviews its legality, EPA and some states are moving ahead with the carbon reduction concepts, programs, and complementary activities. Other states are focusing efforts on the existing workload of core air quality protection work. The session will focus on the status of state and federal carbon-oriented actions and "what's next" across the nation, providing ample opportunity for ECOS member and attendee participation.

- Martha Rudolph of Colorado, ECOS President
- Avi Garbow, OGC
- Todd Parfitt, Director, Wyoming Department of Environmental Quality, and ECOS Secretary-Treasurer

[7:30 p.m.] Optional "We're All for the Hall" Benefit Concert featuring Keith Urban, Vince Gill, and Others
Bridgestone Arena – 501 Broadway, Nashville, Tennessee

Attendees will walk to the arena. Pre-purchased ECOS tickets will be available for pickup at the registration desk on April 12. Tickets are still available [here](#).

Wednesday, April 13th – OPEN TO ALL ATTENDEES UNTIL 9:30 A.M.

[8:00 – 9:15 a.m.] Breakfast, with Remarks by the Honorable Bill Haslam, Governor of Tennessee, followed by Progress and Plans for the State-Federal Partnership, featuring the Honorable Gina McCarthy, U.S. EPA Administrator, and ECOS President Martha Rudolph of Colorado

103 A-B

This dialogue will highlight EPA and state priorities for the coming months, explore the rich potential of the state-federal partnership, and invite audience participation. Invited to sit at the head table during the lunch:

Administrator McCarthy, Stan Meiburg, Heather McTeer Toney, and Mark Rupp.

- The Honorable Bill Haslam, Governor of Tennessee
- Gina McCarthy, Administrator, U.S. EPA
- Martha Rudolph of Colorado, ECOS President
- Alexandra Dunn, ECOS Executive Director and General Counsel (moderator)

[9:15 – 9:30 a.m.] Fresh Air Break, without Refreshments

104 A-D Foyer

[9:30 – 10:30 a.m.] CLOSED SESSION: State-U.S. EPA Roundtable

104 A-D

Discussion will focus on working cooperatively in response to crises. Open to states, U.S. EPA, federal agencies, and state association staff.

Seated on stage:

- Gina McCarthy, Administrator, U.S. EPA
- Stan Meiburg, Acting Deputy Administrator, U.S. EPA
- Martha Rudolph of Colorado, ECOS President
- John Stine of Minnesota, ECOS Vice President
- Todd Parfitt of Wyoming, ECOS Secretary-Treasurer
- Bob Martineau of Tennessee, ECOS Past President

Seated at tables with ECOS Members:

- Regional Administrators/Deputy Regional Administrators
- Nitin Natarajan, OLEM
- Dr. Tom Burke, ORD
- Mark Rupp, OCIR

[10:30 – 10:45 a.m.] Fresh Air Break, with Refreshments

104 A-D Foyer

[10:45 a.m. – 12:45 p.m.] CLOSED SESSION: States-Only Cutting-Edge Breakouts

103 A-B

This session will provide an opportunity for ECOS members to spend time at three topically oriented tables: methane, grants, and federal facilities (10:45 – 11:20 a.m.); nuclear decommissioning, state agency budgets, and crisis response (11:25 – 12:00 p.m.); and toxics, management innovations and lean, and Partnership Action Plans (12:10 – 12:45 p.m.). Open to states and state association staff (No EPA Participants).

[1:00 – 3:15 p.m.] CLOSED SESSION: ECOS Federal Facilities Forum

105 A

This session is open to states, federal agencies, and invited guests.

- Shari Meghreblian of Tennessee, Federal Facilities Forum Chair
- Stan Meiburg, Acting Deputy Administrator, U.S. EPA
- Ann Heard, R4
- Sam Coleman, R6
- Michelle Pirzadeh, R10
- Barry Breen, OLEM
- Charlotte Bertrand, Greg Gervais, OLEM/FFRRO
- Mark Whitney, Principal Deputy Assistant Secretary for Environmental Management, DOE
- Karen Baker, Chief, Environmental Division, U.S. Army Corps of Engineers

[1:00 – 3:00 p.m.] CLOSED SESSION: Natural Resources Forum**104 A-D**

This always-popular forum will include discussion of productive structures to coordinate environmental and natural resource issues. It will spotlight three case studies from ECOS members of large projects where the integration of these issues was front and center – situations involving mining, construction of recreational facilities, and species protection. The forum also will explore strategies for improving agency coordination and communication with stakeholders. Open to states and invited guests (No EPA Participants).

[2:15 – 7:00 p.m.] CLOSED SESSION: E-Enterprise for the Environment Leadership Council**103 C**

Open to states, territories, tribes, and EPA.

THURSDAY, APRIL 14**[8:00 a.m. – 2:15 p.m.] CLOSED SESSION: E-Enterprise for the Environment Leadership Council Continued****103 C**

Open to states, territories, tribes, and EPA

Upcoming ECOS Meetings

July 21, 2016: State Environmental Protection (STEP) Meeting: The Water/Energy/Air Nexus (Washington, DC)

July 22, 2016: ECOS-EPA Leadership Meeting (Washington, DC)

September 25-27, 2016: ECOS 2016 Fall Meeting (Wheeling, West Virginia)

April 6-8, 2017: ECOS 2017 Spring Meeting (Washington, DC)

TBD: ECOS 2017 Fall Meeting (Jackson Hole, Wyoming)

To: McCabe, Janet[McCabe.Janet@epa.gov]
From: Haman, Patricia
Sent: Tue 3/29/2016 7:37:32 PM
Subject: Automatic reply: Invitation to ozone hearing

Beginning Monday, March 28th, I will be on leave until Monday April 4th; I will be checking email infrequently. I will respond to you as soon as I can. If you need assistance before then, please contact Kevin Bailey at 202-564-2998 or bailey.kevinj@epa.gov. or Matthew Davis at 202-564-1267 or davis.matthew@epa.gov. Thanks. Pat

To: McCabe, Janet[McCabe.Janet@epa.gov]
From: Distefano, Nichole
Sent: Fri 3/25/2016 11:11:01 AM
Subject: Automatic reply: Invitation to ozone hearing

I am currently out of the office, returning March 28, 2016. I will be checking email periodically. If you need assistance please call (202) 564-5200.

To: McCabe, Janet[McCabe.Janet@epa.gov]
From: Monger, Jon
Sent: Fri 3/18/2016 9:24:39 PM
Subject: RE: OAR Weekly Shout Out

Hi Janet- Good seeing you today and the China trip sounds terrific and fascinating. Heads up I think your email just now (I got it) went to OAR but may have been meant for somebody else.

Have a good weekend, Jon

From: McCabe, Janet
Sent: Friday, March 18, 2016 4:58 PM
To: OAR-WIDE-EVERYONE <OARWIDEEVERYONE@epa.gov>; Air Division Directors and Deputies <Air_Division_Directors_and_Deputies@epa.gov>; Air Program Managers - Regions <Air_Program_Managers_Regions@epa.gov>; Nishida, Jane <Nishida.Jane@epa.gov>
Subject: Re: OAR Weekly Shout Out

I got it!

Sent from my iPhone

On Mar 18, 2016, at 4:28 PM, McCabe, Janet <McCabe.Janet@epa.gov> wrote:

Colleagues—

As you may know, a couple of weeks ago I traveled to China to meet with national and local officials, academics, businesses, and civil society to discuss air quality. It was eye-opening, and a valuable reminder not to take for granted the great progress we have made on improving air quality in the United States. One morning in Beijing I woke up early and went for a walk – when the AQI was 293, which is code purple, or “very unhealthy”!

The scale of the air quality challenge China faces is hard to fathom without visiting. But thanks to OAR’s team of experts who have been working with China and with other countries on how to address air quality and climate challenges – in some cases for decades – I had a fascinating, busy, educational, and exhausting trip.

We started on a Sunday, visiting a cookstove and heating stove distribution facility where we saw stoves designed to run on coal, pellets, gas, and electricity. We then visited rural parts of the area around Beijing, where Chinese families welcomed us into their houses so we could see the devices they use to keep their homes warm and cook their food. In the United States, we may have dozens of these implements – from central air to fireplaces and towel warmers in the bathroom, or a stove and a toaster oven and a microwave and...you get the point. These Chinese village houses still had a few ways, but different – like the *kang*, which is a kitchen stove that vents the exhaust heat under an adjacent bed, heating the bed and room. They mainly burn coal or wood, and piles of fuel and the smell of smoke were everywhere.

The next three days in Beijing were filled with meetings. We sat down with our direct Chinese counterpart, the Ministry of Environmental Protection, and discussed a wide range of topics related to air quality – such as their effort to put in place permits for hundreds of thousands of emissions sources. We had a rich dialogue with officials from across the Chinese government on U.S. domestic climate actions, including the Clean Power Plan, and a meeting with professors at Tsinghua University who are among China's leaders studying air quality. We visited the headquarters of the Beijing Environmental Protection Bureau (Beijing has a population of more than 21 million people, so they have a lot to do!), met with representatives of Chinese civil society, discussed joint climate change efforts with the National Development and Reform Commission, toured the factory where Cummins makes state of the art diesel engines – and I gave a speech to dozens of interested members of the public, including many Chinese students, at the American Center.

We then took the train south to Nanjing, a historic national capital that is now the capital of the 80 million-person province of Jiangsu. There, we held a capstone event on a project that the U.S. Trade and Development Agency and OAQPS have been working on for a couple of years, helping the Jiangsu authorities and stakeholders from across China understand how to create and implement a regional air quality plan.

We wrapped up our trip in Shanghai, where we met with representatives from U.S. businesses operating in China to hear their views on the variety of issues they face. We also sat down with the Shanghai Environmental Protection Bureau (Shanghai is even bigger than Beijing, with more than 24 million residents) and toured their state of the art laboratory.

In all of these meetings, we were carrying the key message that air quality is a local,

regional, national and global issue. This is a lesson that we had to learn in the United States, too, not all that long ago. Whether it is cleaner cookstoves for moms and dads and kids in a Chinese village, a cleaner bus or truck that drives on our city streets or highways, or cleaner power plants that supply our electricity, we are joined together to reduce local and global air pollutants such as PM2.5, ozone, mercury, and carbon in the fight for cleaner air and healthy communities.

I have many people to thank for making this week so productive. The OAR delegation in China included staff from OAQPS, OAP and the IO, with different people joining different meetings. At various points in time, I sat next to and relied on Jim Blubaugh, Kong Chiu, Rich Damberg, Dale Evarts, John Mitchell, William Niebling, Jeremy Schreifels, and Rebecca Schultz, all of whom are involved in work with China on an ongoing basis. But they weren't alone. Back in Washington and RTP, many others helped make the trip successful and constructive: Emily Atkinson, Kristen Bremer, Cynthia Browne, Carissa Cyran, Allison Dennis, Marlene Jones, Mark Kasman, Shanita Loving, Kristal Mozingo, Josh Novikoff, Luis Troche, Scott Voorhees, and Steve Wolfson. Several hard-working State Department colleagues paved the way for us, kept us on time, and helped explain what we were seeing and hearing: Stefan Whitney, Charles Reynolds, Chen Xinrong.

Have a nice weekend everyone.

Janet

<image001.jpg>

<image004.jpg>

View of the Beijing skyline and haze
in Beijing

Air Quality monitors

<image006.jpg>

<image007.jpg>

Charcoal for stoves and boilers
adjacent *kang*

Kitchen stove, heating an

<image009.jpg><image010.jpg>

Beijing Environmental Protection Bureau
Officials
Environmental Monitoring Center

Tour of Beijing

<image011.jpg>

Cummins diesel factory in Beijing

To: OAR-WIDE-EVERYONE[OARWIDEEVERYONE@epa.gov]; Air Division Directors and Deputies[Air_Division_Directors_and_Deputies@epa.gov]; Air Program Managers - Regions[Air_Program_Managers_Regions@epa.gov]; Nishida, Jane[Nishida.Jane@epa.gov]
From: McCabe, Janet
Sent: Fri 3/18/2016 8:57:42 PM
Subject: Re: OAR Weekly Shout Out

I got it!

Sent from my iPhone

On Mar 18, 2016, at 4:28 PM, McCabe, Janet <McCabe.Janet@epa.gov> wrote:

Colleagues—

As you may know, a couple of weeks ago I traveled to China to meet with national and local officials, academics, businesses, and civil society to discuss air quality. It was eye-opening, and a valuable reminder not to take for granted the great progress we have made on improving air quality in the United States. One morning in Beijing I woke up early and went for a walk – when the AQI was 293, which is code purple, or “very unhealthy”!

The scale of the air quality challenge China faces is hard to fathom without visiting. But thanks to OAR’s team of experts who have been working with China and with other countries on how to address air quality and climate challenges – in some cases for decades – I had a fascinating, busy, educational, and exhausting trip.

We started on a Sunday, visiting a cookstove and heating stove distribution facility where we saw stoves designed to run on coal, pellets, gas, and electricity. We then visited rural parts of the area around Beijing, where Chinese families welcomed us into their houses so we could see the devices they use to keep their homes warm and cook their food. In the United States, we may have dozens of these implements – from central air to fireplaces and towel warmers in the bathroom, or a stove and a toaster oven and a microwave and...you get the point. These Chinese village houses still had a few ways, but different – like the *kang*, which is a kitchen stove that vents the exhaust heat under an adjacent bed, heating the bed and room. They mainly burn coal or wood, and piles of fuel and the smell of smoke were everywhere.

The next three days in Beijing were filled with meetings. We sat down with our direct Chinese counterpart, the Ministry of Environmental Protection, and discussed a wide range of topics related to air quality – such as their effort to put in place permits for hundreds of thousands of emissions sources. We had a rich dialogue with officials from across the Chinese government on U.S. domestic climate actions, including the Clean Power Plan, and a meeting with professors at Tsinghua University who are among China's leaders studying air quality. We visited the headquarters of the Beijing Environmental Protection Bureau (Beijing has a population of more than 21 million people, so they have a lot to do!), met with representatives of Chinese civil society, discussed joint climate change efforts with the National Development and Reform Commission, toured the factory where Cummins makes state of the art diesel engines – and I gave a speech to dozens of interested members of the public, including many Chinese students, at the American Center.

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Kitchen stove, heating an

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Beijing Environmental Protection Bureau
Officials

Tour of Beijing

Environmental Monitoring Center

<image011.jpg>

Cummins diesel factory in Beijing

From: Atkinson, Emily
Location: 1615 H Street NW
Importance: Normal
Subject: US Chamber Speech (Confirmed)
Categories: Green Category
Start Date/Time: Fri 4/8/2016 1:00:00 PM
End Date/Time: Fri 4/8/2016 2:00:00 PM
[RE: U.S. Chamber Meeting - April 8](#)
[RE: U.S. Chamber Meeting - April 8](#)
[RE: U.S. Chamber Meeting - April 8](#)
[McCabe Speaking Form.docx](#)
[Panel Speakers.doc](#)
[RE: U.S. Chamber Meeting - April 8](#)

Event Information Form

This form has been designed to assist in planning participation in events and activities.
This is not a confirmation of AAA Janet McCabe's attendance.

Basic Background

Name of Event	Energy, Clean Air & Natural Resources Committee Meeting
Sponsoring Organization	U.S. Chamber of Commerce
Date of Event	May 8, 2016
Time of Event	8:30 – 11:30 a.m.
Expected time of remarks or participation by AAA McCabe	9:00 – 9:50 a.m.
Location (please include city/town and street address)	1615 H Street NW, Washington, D.C. 20062
Directions to the event (if appropriate, please also include relevant information about parking, the specific building, and best entrance to use)	Please enter through the front entrance at 1615 H Street NW. (Note: Photo IDs are required for entry.)
Where to meet POC	Front lobby

Event Description and Role of the AAA

Brief description or outline of the event	This is the spring meeting of the U.S. Chamber's Energy, Clean Air & Natural Resources Committee meeting. The committee meets semi-annually.
Brochure, invitation and/or other event material(s)	I will send that information separately by email.
Agenda and order of speakers and biography/information of other speakers	I will send that information separately by email.
Name of person introducing AAA McCabe	Kathy Beckett, Chairman of Energy, Clean Air & Natural Resources Committee
Basic information about the role of the AAA official at the event. (For example, will they serve as a keynote speaker? Participate on a panel? Take part in a press conference? Tour a facility?)	AAA McCabe will be the keynote speaker for the committee meeting.
If the AAA official is a featured speaker, which topic(s) should they address and how long?	Based upon my communications with AAA McCabe's staff, she has requested 25-30 minutes for remarks and 15-20 minutes for Q&A. Those times work for us, but if the AAA would like more time, we are happy to accommodate that request.
What rules would the audience like to hear about?	Clean Power Plan, Ozone NAAQS, Methane regulations for oil & gas sector, regional haze, Utility MACT, Cross-State Air Pollution Rule, RTRs, SSM, Accidental Release Prevention Risk Management Program
Will there be time for Q&A? If so, who will be moderating?	Yes, Kathy Beckett (see above) will moderate.

Do you have a sense of the types of questions that may be asked?	I think the committee members will want to hear about the status and implementation of certain rules, i.e. CPP, ozone; outreach for proposed rulemakings, i.e. methane regulations; and plans for other rulemakings through the end of this Administration.
Recommendations on the use of visuals/PowerPoint. Should the AAA official plan on using a PowerPoint Presentation?	We have PowerPoint capabilities if AAA McCabe would like to use it. If you could let us know that ahead of time, we would appreciate it; and, if we could get a copy of her slides a couple of days before the meeting to test them, that would be helpful. You can specify whether the slides can be shared with the meeting participants later or if you do not want them distributed.
What is the physical layout of the room (e.g. size, and format of the interaction; podium, seated in armchair dialogue, or at a table, etc.)	We will have a podium and front table with 4-5 chairs at the front of the room with round tables facing the podium for the audience. AAA McCabe can be seated at the table during her introduction and then give the keynote from the podium.

About the Audience

Please tell us about the make-up of the audience for the event:	The committee is comprised of representatives from companies, trade associations, and local/state chambers of commerce, representing a broad array of businesses and industry, including oil & gas, utilities, renewables, agriculture, manufacturing, chemical, technology, financial services, and construction.
Expected number in attendance at the event	50-75
Will it be largely members of your organization?	Yes
Will others be in attendance? If so, who will be at the event? (General public, Businesspeople, Educators, Families, Students – what grade level, Children – how old)	No
Others? (Please describe)	N/A
Is the event open to press?	No

Contact Information

Your name:	Mary Martin
Telephone Number:	202.463.5986
Mailing Address:	1615 H Street NW Washington, D.C. 20062
E-Mail Address:	mmartin@uschamber.com
Cell Phone Number:	703.608.2994
Fax Number:	202.463.5521
Best way to reach you at the event?	Email or text on cell phone

EPA Contact Person

Emily Atkinson, Administrative Assistant to Janet McCabe: 202-564-7404

Allison Dennis, Public Affairs Specialist: 202-564-1985

To: Dewey, Amy[Dewey.Amy@epa.gov]; McCabe, Janet[McCabe.Janet@epa.gov]; Atkinson, Emily[Atkinson.Emily@epa.gov]; Stewart, Lori[Stewart.Lori@epa.gov]; Goffman, Joseph[Goffman.Joseph@epa.gov]
From: Dennis, Allison
Sent: Fri 2/26/2016 6:41:57 PM
Subject: RE: U.S. Chamber Meeting - April 8

Hi Amy, I'll be in touch soon.

From: Dewey, Amy
Sent: Friday, February 26, 2016 1:27 PM
To: McCabe, Janet <McCabe.Janet@epa.gov>; Atkinson, Emily <Atkinson.Emily@epa.gov>; Dennis, Allison <Dennis.Allison@epa.gov>; Stewart, Lori <Stewart.Lori@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>
Subject: RE: U.S. Chamber Meeting - April 8

Great! Since Emily is out for a week, would you like for me to work with Allison on getting back to the Chamber? Mary Martin will get the full agenda to you shortly and a participant list. Thank you, Amy

Amy H. Dewey

Special Assistant, Office of the Administrator | Office of Public Engagement I Environmental Protection Agency | Tel 202-564-7816 I dewey.amy@epa.gov

From: McCabe, Janet
Sent: Friday, February 26, 2016 8:22 AM
To: Dewey, Amy <Dewey.Amy@epa.gov>; Atkinson, Emily <Atkinson.Emily@epa.gov>; Dennis, Allison <Dennis.Allison@epa.gov>; Stewart, Lori <Stewart.Lori@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>
Subject: RE: U.S. Chamber Meeting - April 8

Sounds like something I would do....

From: Dewey, Amy
Sent: Thursday, February 25, 2016 2:19 PM
To: Atkinson, Emily <Atkinson.Emily@epa.gov>
Cc: McCabe, Janet <McCabe.Janet@epa.gov>
Subject: U.S. Chamber Meeting - April 8

Emily,

Even though we have not attended this meeting recently, the Administrator has talked to and met with their CEO & President, Tom Donohue. Thank you, Amy

Sent: Thursday, February 25, 2016 12:06 PM
To: Dewey, Amy <Dewey.Amy@epa.gov>
Subject: U.S. Chamber Meeting - April 8

Hi Amy:

Hope you are doing well. The U.S. Chamber's Energy, Clean Air & Natural Resources Committee that I oversee is having its semiannual meeting on **Friday, April 8** in the **morning** here at the Chamber (**1615 H Street NW**). I am writing to see about the possibility of having Assistant Administrator McCabe speak at the meeting, if she has interest and availability. Given the policy issues addressed by this Chamber committee, it would be helpful to hear from the Assistant Administrator about the Agency's activities on climate (including the Clean Power Plan), methane regulations, ozone implementation, and any other air-related issues, including the Agency's priorities for the remainder of the year.

Regarding the time of the meeting, we are scheduled to begin at 9:00 a.m. on April 8 (Friday). I'm still putting the agenda together so I have flexibility in terms of the specific time – between **9:00 a.m. and 11:00 a.m.** would work. We have had DOE and OMB representatives speak to this Committee in the last few years; however, it has been awhile since we have had EPA participate, so it would be helpful and interesting to have Assistant Administrator McCabe speak.

If you need additional information, please let me know. Also, if there is interest and availability, I will follow up with a more formal invitation.

Thanks so much,

Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

U.S. Chamber of Commerce

1615 H Street, N.W. | Washington, D.C. 20062

T: 202.463.5986 | F: 202.463.5521 | M: 703.608.2994

mmartin@uschamber.com

To: Dennis, Allison[Dennis.Allison@epa.gov]; Dewey, Amy[Dewey.Amy@epa.gov]
Cc: Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Martin, Mary
Sent: Thur 3/10/2016 9:33:12 PM
Subject: RE: U.S. Chamber Meeting - April 8

Hi Allison:

Absolutely no apologies required. I'm so glad that we are going to be able to make this work. The 9:00 – 10:00 a.m. hour sounds great. How long were you thinking for her presentation, and how long would she want to take for questions? (Again, we're flexible.) Also, we will put her name on the next invitation that goes out, as the keynote speaker.

Thanks again!

Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

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mmartin@uschamber.com

From: Dennis, Allison [mailto:Dennis.Allison@epa.gov]
Sent: Thursday, March 10, 2016 3:56 PM
To: Martin, Mary; Dewey, Amy
Cc: Atkinson, Emily
Subject: RE: U.S. Chamber Meeting - April 8

Hi Mary,

My apologies for the delayed response.

You asked:

- 1) would it be ok to list her as the keynote speaker on the next invitation that goes out to my committee members (probably tomorrow or Thursday)? **Response: Yes!**
- 2) (2) is there a particular window of time that works best for her between 9:00 – 11:30 a.m. on April 8? I have not set the agenda yet so there is flexibility, but I would like to get the specific times firmed up this week, if possible. **Response: Morning is best...will sometime between 9 – 10 work?**

Thanks! /Allison

From: Martin, Mary [<mailto:mmartin@USChamber.com>]

Sent: Tuesday, March 08, 2016 4:00 PM

To: Dewey, Amy <Dewey.Amy@epa.gov>; Dennis, Allison <Dennis.Allison@epa.gov>

Cc: Atkinson, Emily <Atkinson.Emily@epa.gov>

Subject: RE: U.S. Chamber Meeting - April 8

Importance: High

Hi Amy, Allison and Emily:

Hope you are doing well and enjoying the nice weather! Attached is the speaking invitation for Assistant Administrator McCabe for the April 8 U.S. Chamber meeting. We are very excited about the prospect of having the Assistant Administrator speak at the meeting. I have a couple of preliminary questions – (1) would it be ok to list her as the keynote speaker on the next invitation that goes out to my committee members (probably tomorrow or Thursday)? and (2) is there a particular window of time that works best for her between 9:00 – 11:30 a.m. on April 8? I have not set the agenda yet so there is flexibility, but I would like to get the specific times firmed up this week, if possible.

Please let me know what other information you need from us. Thank you in advance for your

time, responsiveness and efforts on this matter.

Best,

Mary

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mmartin@uschamber.com

From: Dewey, Amy [<mailto:Dewey.Amy@epa.gov>]

Sent: Monday, February 29, 2016 6:03 PM

To: Dennis, Allison

Cc: Atkinson, Emily; Martin, Mary

Subject: Re: U.S. Chamber Meeting - April 8

Allison, Mary Martin is sending us an official invitation letter with details but please feel free to contact her directly I have cc'd her on this email. I am out of the office tomorrow and will be back on Wed. Amy

Sent from my iPhone

On Feb 29, 2016, at 2:58 PM, Dennis, Allison <Dennis.Allison@epa.gov> wrote:

Thanks Emily!

Amy- should I work through you to get more details on this event (to help with Janet's prep) or work directly with Mary? Happy to do whatever you prefer! /Allison

Sent: Thursday, February 25, 2016 12:06 PM
To: Dewey, Amy <Dewey.Amy@epa.gov>
Subject: U.S. Chamber Meeting - April 8

Hi Amy:

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Cc: Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Martin, Mary
Sent: Fri 3/18/2016 10:01:11 PM
Subject: RE: U.S. Chamber Meeting - April 8
McCabe Speaking Form.docx

Hi Allison: Attached is the completed speaking form for AAA McCabe's keynote speech at the Chamber on April 8. Please let me know if you have any follow-up questions and/or need additional information. Thanks again and have a nice weekend, Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

U.S. Chamber of Commerce

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mmartin@uschamber.com

From: Dennis, Allison [mailto:Dennis.Allison@epa.gov]
Sent: Monday, March 14, 2016 10:09 AM
To: Martin, Mary; Dewey, Amy
Cc: Atkinson, Emily
Subject: RE: U.S. Chamber Meeting - April 8

Hi Mary,

One ask from us: At your earliest convenience, can you please complete and return the attached event form? It helps us prepare. Thanks! /Allison

From: Martin, Mary [<mailto:mmartin@USChamber.com>]
Sent: Friday, March 11, 2016 3:40 PM
To: Dennis, Allison <Dennis.Allison@epa.gov>; Dewey, Amy <Dewey.Amy@epa.gov>
Cc: Atkinson, Emily <Atkinson.Emily@epa.gov>
Subject: RE: U.S. Chamber Meeting - April 8

Allison: That sounds good – I will put her on the agenda for 9:00 and allot 45-50 minutes for her speech and Q&A. As soon as we have the agenda finalized, I will send you a copy. One more logistic matter – do you have a bio that you use for the Assistant Administrator? If the one on the website works, we can use that one; but if you have a particular one that you like to use, please send it to us. Finally, if you need any additional information, please do not hesitate to reach out. Thanks and have a great weekend, Mary

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Subject: RE: U.S. Chamber Meeting - April 8

How about we aim for something in the range 25-30 min of remarks followed by 15-20 min of Q&A (for a total of 45 minutes)?

From: Martin, Mary [<mailto:mmartin@USChamber.com>]
Sent: Thursday, March 10, 2016 4:33 PM
To: Dennis, Allison <Dennis.Allison@epa.gov>; Dewey, Amy <Dewey.Amy@epa.gov>
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Subject: U.S. Chamber Meeting - April 8

Hi Amy:

Hope you are doing well. The U.S. Chamber's Energy, Clean Air & Natural Resources Committee that I oversee is having its semiannual meeting on **Friday, April 8** in the **morning** here at the Chamber (**1615 H Street NW**). I am writing to see about the possibility of having Assistant Administrator McCabe speak at the meeting, if she has interest and availability. Given the policy issues addressed by this Chamber committee, it would be helpful to hear from the Assistant Administrator about the Agency's activities on climate (including the Clean Power Plan), methane regulations, ozone implementation, and any other air-related issues, including the Agency's priorities for the remainder of the year.

Regarding the time of the meeting, we are scheduled to begin at 9:00 a.m. on April 8 (Friday). I'm still putting the agenda together so I have flexibility in terms of the specific time – between **9:00 a.m. and 11:00 a.m.** would work. We have had DOE and OMB representatives speak to this Committee in the last few years; however, it has been awhile since we have had EPA participate, so it would be helpful and interesting to have Assistant Administrator McCabe speak.

If you need additional information, please let me know. Also, if there is interest and availability, I will follow up with a more formal invitation.

Thanks so much,

Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

U.S. Chamber of Commerce

1615 H Street, N.W. | Washington, D.C. 20062

T: 202.463.5986 | F: 202.463.5521 | M: 703.608.2994

mmartin@uschamber.com

To: Dennis, Allison[Dennis.Allison@epa.gov]; Dewey, Amy[Dewey.Amy@epa.gov]
Cc: Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Martin, Mary
Sent: Tue 3/29/2016 2:12:39 PM
Subject: RE: U.S. Chamber Meeting - April 8
Panel Speakers.doc

Hi Allison:

I hope you are doing well and enjoying what is starting to feel like true spring weather. Regarding the Chamber meeting next Friday (April 8), I just wanted to make sure that we are all set in terms of AAA McCabe's keynote. I have attached a copy of the bios for the other speakers at the meeting – representatives from OMB and CEQ will be giving a presentation on the new permit streamlining laws that were passed as part of the FAST Act last year. Also, I will get you a copy of the agenda by tomorrow – we have AAA McCabe speaking from 9:00 – 9:55 a.m. (including Q&A).

Finally, will you be accompanying AAA McCabe to the meeting next week?

Thanks,

Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

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mmartin@uschamber.com

From: Martin, Mary
Sent: Tuesday, March 22, 2016 2:44 PM
To: 'Dennis, Allison'; 'Dewey, Amy'

Cc: 'Atkinson, Emily'
Subject: RE: U.S. Chamber Meeting - April 8

Allison: I noticed one typo from the form that I sent you last week – I listed the date as “May 8” instead of “April 8.” Apologies for the error; attached is the corrected form. Thanks, Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

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mmartin@uschamber.com

From: Martin, Mary
Sent: Friday, March 18, 2016 6:01 PM
To: 'Dennis, Allison'; Dewey, Amy
Cc: Atkinson, Emily
Subject: RE: U.S. Chamber Meeting - April 8

Hi Allison: Attached is the completed speaking form for AAA McCabe’s keynote speech at the Chamber on April 8. Please let me know if you have any follow-up questions and/or need additional information. Thanks again and have a nice weekend, Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

U.S. Chamber of Commerce

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mmartin@uschamber.com

From: Dennis, Allison [<mailto:Dennis.Allison@epa.gov>]
Sent: Monday, March 14, 2016 10:09 AM
To: Martin, Mary; Dewey, Amy
Cc: Atkinson, Emily
Subject: RE: U.S. Chamber Meeting - April 8

Hi Mary,

One ask from us: At your earliest convenience, can you please complete and return the attached event form? It helps us prepare. Thanks! /Allison

From: Martin, Mary [<mailto:mmartin@USChamber.com>]
Sent: Friday, March 11, 2016 3:40 PM
To: Dennis, Allison <Dennis.Allison@epa.gov>; Dewey, Amy <Dewey.Amy@epa.gov>
Cc: Atkinson, Emily <Atkinson.Emily@epa.gov>
Subject: RE: U.S. Chamber Meeting - April 8

Allison: That sounds good – I will put her on the agenda for 9:00 and allot 45-50 minutes for her speech and Q&A. As soon as we have the agenda finalized, I will send you a copy. One more logistic matter – do you have a bio that you use for the Assistant Administrator? If the one on the website works, we can use that one; but if you have a particular one that you like to use, please send it to us. Finally, if you need any additional information, please do not hesitate to reach out. Thanks and have a great weekend, Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

U.S. Chamber of Commerce

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mmartin@uschamber.com

From: Dennis, Allison [<mailto:Dennis.Allison@epa.gov>]

Sent: Friday, March 11, 2016 9:06 AM

To: Martin, Mary; Dewey, Amy

Cc: Atkinson, Emily

Subject: RE: U.S. Chamber Meeting - April 8

How about we aim for something in the range 25-30 min of remarks followed by 15-20 min of Q&A (for a total of 45 minutes)?

From: Martin, Mary [<mailto:mmartin@USChamber.com>]

Sent: Thursday, March 10, 2016 4:33 PM

To: Dennis, Allison <Dennis.Allison@epa.gov>; Dewey, Amy <Dewey.Amy@epa.gov>

Cc: Atkinson, Emily <Atkinson.Emily@epa.gov>

Subject: RE: U.S. Chamber Meeting - April 8

Hi Allison:

Absolutely no apologies required. I'm so glad that we are going to be able to make this work. The 9:00 – 10:00 a.m. hour sounds great. How long were you thinking for her presentation, and how long would she want to take for questions? (Again, we're flexible.) Also, we will put her name on the next invitation that goes out, as the keynote speaker.

Thanks again!

Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

U.S. Chamber of Commerce

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T: 202.463.5986 | F: 202.463.5521 | M: 703.608.2994

mmartin@uschamber.com

From: Dennis, Allison [<mailto:Dennis.Allison@epa.gov>]

Sent: Thursday, March 10, 2016 3:56 PM

To: Martin, Mary; Dewey, Amy

Cc: Atkinson, Emily

Subject: RE: U.S. Chamber Meeting - April 8

Hi Mary,

My apologies for the delayed response.

You asked:

- 1) would it be ok to list her as the keynote speaker on the next invitation that goes out to my committee members (probably tomorrow or Thursday)? **Response: Yes!**
- 2) (2) is there a particular window of time that works best for her between 9:00 – 11:30 a.m. on April 8? I have not set the agenda yet so there is flexibility, but I would like to get the specific times firmed up this week, if possible. **Response: Morning is best...will sometime between 9 – 10 work?**

Thanks! /Allison

From: Martin, Mary [<mailto:mmartin@USChamber.com>]

Sent: Tuesday, March 08, 2016 4:00 PM

To: Dewey, Amy <Dewey.Amy@epa.gov>; Dennis, Allison <Dennis.Allison@epa.gov>

Cc: Atkinson, Emily <Atkinson.Emily@epa.gov>

Subject: RE: U.S. Chamber Meeting - April 8
Importance: High

Hi Amy, Allison and Emily:

Hope you are doing well and enjoying the nice weather! Attached is the speaking invitation for Assistant Administrator McCabe for the April 8 U.S. Chamber meeting. We are very excited about the prospect of having the Assistant Administrator speak at the meeting. I have a couple of preliminary questions – (1) would it be ok to list her as the keynote speaker on the next invitation that goes out to my committee members (probably tomorrow or Thursday)? and (2) is there a particular window of time that works best for her between 9:00 – 11:30 a.m. on April 8? I have not set the agenda yet so there is flexibility, but I would like to get the specific times firmed up this week, if possible.

Please let me know what other information you need from us. Thank you in advance for your time, responsiveness and efforts on this matter.

Best,

Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

U.S. Chamber of Commerce

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mmartin@uschamber.com

From: Dewey, Amy [<mailto:Dewey.Amy@epa.gov>]
Sent: Monday, February 29, 2016 6:03 PM

To: Dennis, Allison
Cc: Atkinson, Emily; Martin, Mary
Subject: Re: U.S. Chamber Meeting - April 8

Allison, Mary Martin is sending us an official invitation letter with details but please feel free to contact her directly I have cc'd her on this email. I am out of the office tomorrow and will be back on Wed. Amy

Sent from my iPhone

On Feb 29, 2016, at 2:58 PM, Dennis, Allison <Dennis.Allison@epa.gov> wrote:

Thanks Emily!

Amy- should I work through you to get more details on this event (to help with Janet's prep) or work directly with Mary? Happy to do whatever you prefer! /Allison

Sent: Thursday, February 25, 2016 12:06 PM
To: Dewey, Amy <Dewey.Amy@epa.gov>
Subject: U.S. Chamber Meeting - April 8

Hi Amy:

Hope you are doing well. The U.S. Chamber's Energy, Clean Air & Natural Resources Committee that I oversee is having its semiannual meeting on **Friday, April 8** in the **morning** here at the Chamber (**1615 H Street NW**). I am writing to see about the possibility of having Assistant Administrator McCabe speak at the meeting, if she has interest and availability. Given the policy issues addressed by this Chamber committee, it would be helpful to hear from the Assistant Administrator about the Agency's activities on climate (including the Clean Power Plan), methane regulations, ozone implementation, and any other air-related issues, including the Agency's priorities for the remainder of the year.

Regarding the time of the meeting, we are scheduled to begin at 9:00 a.m. on April 8 (Friday). I'm still putting the agenda together so I have flexibility in terms of the specific time – between **9:00 a.m. and 11:00 a.m.** would work. We have had DOE and OMB representatives speak to this Committee in the last few years; however, it has been awhile since we have had EPA participate, so it would be helpful and interesting to have Assistant Administrator McCabe speak.

If you need additional information, please let me know. Also, if there is interest and availability,

I will follow up with a more formal invitation.

Thanks so much,

Mary

Mary K. Martin | Energy, Clean Air & Natural Resources Policy Counsel

U.S. Chamber of Commerce

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T: 202.463.5986 | F: 202.463.5521 | M: 703.608.2994

mmartin@uschamber.com

Sent: Wed 4/13/2016 6:47:26 PM
Subject: Re: Action: Work plan requirement for incomplete Web Plan topic

Below is comprehensive list of OAR's remaining web topics to be published in Drupal in FY2016. This refreshed list includes a few additional topics (see bolded web areas). Green font represents topics launched in Drupal and web topics with a strike-out line represent topics OAR is no longer pursuing.

Quarter 1 – Dec. 31, 2015

Quarter 2 – March 31, 2016

Quarter 3 – June 30, 2016

Quarter 4 – September 30, 2016

Combined Heat and Power Partnership (OAP)

Hazardous Air Pollutants (OAQPS)

National-Scale Air Toxics Assessments (OAQPS)

Operating Permits (OAQPS)

NSR Permitting (OAQPS)

Acid Rain (OAP)

Ozone Layer Protection (OAP)

Motor Vehicle Air Conditioning (OAP)

Phase-out of Ozone-Depleting Substances (OAP)

Stationary Refrigeration and Air Conditioning (OAP)

Green Power Partnership (OAP)

Climate and Energy Resources for State, Local and Tribal Governments (OAP)

Air Quality Data and Tools landing page (OAQPS)

Voluntary Programs landing page (OAQPS)

Community Involvement (OAQPS)

Advance (OAQPS)

Criteria Air Pollutants landing page (OAQPS)

Lead Pollution (OAQPS)

Ozone Pollution (OAQPS)

Ozone Designations (OAQPS)

Stationary Sources landing page (OAQPS)

Agriculture, Food and Forest Products (OAQPS)

Chemical Production and Distribution (OAQPS)

Generic Chemical Rules

Foam, Fiber, Plastics and Rubber Products (OAQPS)

Visibility (OAQPS)

Air Quality Management Process (OAQPS)

Verified Technologies for SmartWay and Clean Diesel (OTAQ)

Emission Standards Reference Guide (OTAQ)

Green Vehicle Guide (OTAQ)

Green Racing (OTAQ)

Vehicle and Fuel Emissions Testing (OTAQ)

Tribal Air & Climate Resources (OAR IO)

Cross-State Rule Air Pollution Rule (OAP)

Emissions Trading Resources (OAP)

Collision Repair (OAQPS)

Training (OAQPS)

Energy Efficiency and Renewable Energy (OAQPS)

Particle Pollution (OAQPS)

Sulfur Dioxide Pollution (OAQPS)

Lead Designations (OAQPS)

Nitrogen Dioxide Designations (OAQPS)

Sulfur Dioxide Designations (OAQPS)

Electric Utilities (OAQPS)

Mercury and Air Toxics Standards (OAQPS)

Metals Production (OAQPS)

Mineral Processing (OAQPS)
 Oil & Nat. Gas Production & Distribution (OAQPS)
 Agricultural Monitoring (OAQPS)
 General Conformity (OAQPS)
 Air Pollution Transportation Models (OTAQ)
 Motor Vehicle Emissions Simulator (MOVES) Model (OTAQ)
 State and Local Transportation (OTAQ)
 SmartWay (OTAQ)
 Health Effects from Transportation Pollution (OTAQ)
 Air Pollution and Climate Change from Transportation (OTAQ)- moved from Q2
 Climate Change Landing Page (OAP)
 Climate Indicators (OAP)
 Climate Change Science (OAP)
 Greenhouse Gas Emissions (OAP)
 Climate Impacts (OAP)
 Global Mitigation of Non-CO2 GHG Report (OAP)
 Global Methane Initiative (OAP)
 High-Global Warming Potential Voluntary Programs (OAP)
 Coalbed Methane Outreach (OAP)
 Landfill Methane Outreach Program (OAP)
 Natural Gas STAR (OAP)
 AirData (OAQPS)
 AirTrends (OAQPS)
 Air Emissions Sources (OAQPS)
 Carbon Monoxide Pollution (OAQPS)
 Nitrogen Dioxide Pollution (OAQPS)
 Particle Pollution Designations (OAQPS)
 Secondary Air Pollution Standards for Nitrogen Dioxide and Sulfur Dioxide (OAQPS)
 Energy, Engines, and Combustion (OAQPS)
 Petroleum Refineries and Distribution (OAQPS)
 Semiconductor Manufacturing (OAQPS)
 Solvent Use and Surface Coating (OAQPS)
 Sterilizers (OAQPS)
 Waste Management (OAQPS)
 Health Effects Notebook (OAQPS)
 Oil and Gas Production (OAQPS)
 Stationary Engines (OAQPS)
 Boilers & Process Heaters (OAQPS)
 Petroleum Refineries (OAQPS)
 Technical Air Resources (OAQPS)
 TTN-Air Emissions Modeling (OAQPS)
 TTN-Air Emissions Factors (OAQPS)
 TTN-Air Emission Measurement Center (OAQPS)
 TTN-Air Quality Models (OAQPS)
 TTN-Air Quality Monitoring (OAQPS)
 TTN-Clean Air Technology Center (OAQPS)
 TTN-Economic & Cost Analysis (OAQPS)
 TTN-Electronic Air Emissions Reporting & Recordkeeping (OAQPS)
 TTN-Emissions Monitoring Knowledge Base (OAQPS)
 TTN – Clearinghouse for Inventories and Emissions Factors
 TTN – Reviewing NAAQS- Scientific and Technical Information (OAQPS)
 Outdoor Air Pollution landing page (OAQPS)
 AQ Reg and Standards for Vehicles and Engines (OTAQ)
 GHG Regs and Standards for Vehicles and Engines (OTAQ)
 Air Toxics from Transportation Pollution (OTAQ)
 Certification and Compliance Help for Vehicle and Engine Manufacturers

(OTAQ)
Fuel Economy (OTAQ)
Vehicle and Engines Landing Page (OTAQ)
Certification and Fuel Economy Data for Vehicles and Engines
(OTAQ)
Violations and Recalls for Vehicles and Engines
Updated April 7, 2016

Sent: Tue 4/12/2016 8:37:52 PM
Subject: Natural Gas Vehicle NOx Reduction Projects

NGVAmerica □ 400 N. Capitol St, STE 450 □ Washington, DC 20001 April 11, 2016 The Honorable Gina McCarthy Administrator Environmental Protection Agency 1200 Pennsylvania Ave NW Washington, DC 20460 Dear Administrator McCarthy: We are writing to strongly encourage the Environmental Protection Agency to ensure that any settlement intended to resolve the nitrogen oxide (NOx) emissions from Volkswagen's non-compliant diesel vehicles include projects utilizing the latest natural gas engine technology. An unprecedented opportunity exists to leverage private investment to dramatically improve air quality in the most polluted urban areas of the country. We strongly believe that Supplemental Environmental Projects (SEPs) involving heavy-duty natural gas trucks can play a cost effective role to lower NOx emissions in areas with the most urgent need. The latest natural gas engine technology provides substantial nitrogen oxide (NOx) emission reductions over and above what is currently available or achievable with new diesel engines. This new "Near-Zero" technology was certified in 2015 by both EPA and the California Air Resources Board as reducing NOx emissions by more than 90 percent compared to current heavy duty engine standards. This technology advancement was developed through the combined efforts and funding by Cummins Westport, the California Energy Commission and the South Coast Air Quality Management District. The attached document outlines specific projects that could replace older and even new diesel trucks with natural gas trucks powered with "Near-Zero" engines. In terms of cost and scalability, these NGV projects provide the single most effective pathway to reducing NOx and addressing the excess NOx emissions associated with Volkswagen's non-compliant diesel vehicles. Over its lifetime, each natural gas truck put on the road under these proposals will offset as much as 1 to 2 tons of NOx emissions. Electric vehicle projects intended to offset a similar amount of emissions would have to incentivize and deploy a much larger number of total vehicles at a significantly higher total cost. It would take 43 light duty electric vehicles to offset the same amount of NOx emissions reduced by deploying one new natural gas "Near-Zero" truck, making the natural gas program 9 to 13 times more cost effective than one solely involving EVs (the attached document provides detail on the related assumptions). Furthermore, these projects are compelling given that they deliver surplus emission reductions. The Administration's new National Ambient Air Quality standards will require more counties and cities to find solutions to solve ozone-related pollution and reduce contributing NOx emissions. An historic opportunity exists through SEPs or other settlement programs in the Volkswagen matter for private investment to dramatically improve air quality in these areas. The deployment of new, cleaner "Near-Zero" natural gas engines in regional haul trucking, refuse trucks and transit buses can directly target NOx pollution in areas with the most urgent need. NGVAmerica □ 400 N. Capitol St, STE 450 □ Washington, DC 20001 Attached for your review is a short white paper that outlines three projects that have significant merit and could provide substantial NOx reductions as part of SEPs or other programs related to this case. We respectfully request an opportunity to meet with you and/or your representatives to discuss this matter in greater detail and explore the important opportunity that exists for natural gas vehicles to play a role in improving air quality in communities across the country. Sincerely, Matthew Godlewski, President Dave McCurdy, President & CEO Natural Gas Vehicles for America Sharon Kneiss, President & American Gas Association

CEO Bert Kalisch, President & CEO National Waste & Recycling Association American Public Gas Association Johannes Escudero, Executive Director Coalition for Renewable Natural Gas NGVAmerica □ 400 N. Capitol St, STE 450 □ Washington, DC 20001

Heavy Duty Natural Gas Vehicle NOx Reduction Projects Overview
 Projects utilizing heavy - duty natural gas vehicles (NGVs) provide a substantial opportunity to reduce mobile source related nitrogen oxide (NOx) emissions. In terms of cost and scalability, projects involving the replacement of old or new diesel trucks provide the most attractive pathway to significantly offset NOx emissions. These reductions are possible because the latest natural gas engine technology actually delivers substantial surplus NOx emission reductions. Programs to accelerate the deployment of these engines in heavy - duty applications such as regional haul trucking, refuse trucks and transit buses provide an opportunity to dramatically address NOx pollution in areas of the country with the most urgent need.

Background – “Near - Zero” Natural Gas Engine Technology
 In 2015, the California Air Resources Board (CARB) certified the Cummins Westport (CWI) 8.9 liter ISL G “Near - Zero” heavy duty natural gas engine to a level of 0.02 g/bhp - hr of NOx – a level of emissions that is one - tenth of the current NOx standard of (0.2 g/bhp - hr) for heavy - duty engines. Each engine certified to this level is 90% cleaner and provides surplus emission reductions beyond those required by law. The California Energy Commission and the South Coast Air Quality Management District partnered with CWI to develop this engine to address the urgent need to dramatically reduce ozone forming NOx emissions. This engine will go into production in April 2016. A larger 11.9 liter version of the engine is completing development and will be following soon. At the 0.02 NOx emission level, each new natural gas Class 8 truck that operates with this engine will displace or offset almost 1 ton of NOx over its lifetime. Strategies involving light - duty (LD) electric vehicles (EVs) are estimated to reduce 0.022 tons of nitrogen oxide over the lifetime of each EV deployed, or 43 times fewer emissions than offset by a natural gas truck. (Both examples include benefits matched to comparable new diesel trucks or new gasoline powered cars; replacing older vehicles would be even more significant and in the case of natural gas trucks as much as 2 tons per truck could be offset).

The reason natural gas trucks have such a significant advantage over electric vehicles is simple: 90 percent emissions improvement of a large NOx number with an estimated truck (combination short - haul tractor) life of 931,700 miles is more significant than 100 percent of a very small NOx number on a LD EV with 275,000 lifetime miles (mileage figures based on EPA MOVES model). Deploying one new “Near - Zero” natural gas truck offsets as much NOx as 43 EVs. This underscores why natural gas trucks from a scalability stand point are so attractive since it takes far fewer natural gas trucks to offset a given amount of NOx. Additionally, with the annual class 8 new truck replacement typically in the range of 200,000 vehicles, it is feasible to achieve market penetration results providing these significant NOx offsets within three to five years.

Project 1 – Incentive Program to Deploy “Near - Zero” HD Vehicles in Nonattainment Areas
 This proposal offers the most significant and measurable approach to impact NOx improvement. Given the new National Ambient Air Quality Standards (NAAQS), more counties and cities will be in areas of nonattainment impacted with severe ozone - related pollution that is directly caused by NOx emissions. NGVAmerica □ 400 N. Capitol St, STE 450 □ Washington, DC 20001 These communities could improve air quality quickly through a program to incentivize regional fleets or heavy - duty vehicles operating in or serving nonattainment areas to retire existing diesel trucks, or switch purchases of new diesel vehicles to natural gas trucks powered with the “Near - Zero” technology. A major obstacle

to the deployment of alternative fueled vehicles is the higher incremental cost compared to conventional diesel vehicles. A program that establishes a \$50,000 cash incentive toward the buy down of a "Near - Zero" HD truck, particularly in nonattainment zones would get cleaner natural gas trucks on the road and deliver immediate benefits in a far more cost - effective way than a comparable EV incentive program. As demonstrated below, significant tons of NOx can be reduced:

	Low	Mid	High	Tons of NOx Offset
59,000 Natural Gas Near - Zero HD Trucks	15,000	30,000	63,324	13,976 27,951
Cost @ \$50k per truck	\$750,000,000	\$1,500,000,000	\$3,166,200,000	Incentive Program
Equivalent LD EV's required	646,352	1,292,703	2,728,640	EV Cost Lower
@ \$10k per vehicle	\$6,463,515,569	\$12,927,031,138	\$27,286,402,149	EV Cost
Upper @ \$15k per vehicle	\$9,695,273,353	\$19,390,546,708	\$40,929,603,224	

A program involving natural gas trucks is estimated to be 9 to 13 times more cost effective than one solely focused on EVs. For these calculations, the buy down or incremental cost per natural gas truck is \$50,000. The buy down or rebate incentive for EVs would be \$10,000 - \$15,000 per vehicle (on top of existing federal incentives). Based on these estimates, the cost of NOx reduced is about \$54,000/ton with a "Near - Zero" HD NGV

program, while the EV program cost is \$462,000 - \$694,000/ton. A program involving natural gas trucks can deliver significant NOx reductions and will be less costly and easier to implement since fewer total vehicles will be required. While a truck program can be broadly implemented, additional targeted programs can be offered focusing on disadvantaged communities affected by goods movement at port facilities, urban commercial centers and along congested corridors in areas with the worst air quality problems.

The NGV industry has extensive experience in implementing incentive programs across the nation and would work with Volkswagen and regulators to craft an effective offering to generate results. Properly implemented, this buy down incentive would be sufficient to encourage large fleets already operating in key areas to make the investment to retire older vehicles to get new clean - burning, low - emission natural gas trucks on the road.

NGVAmerica ☐ 400 N. Capitol St, STE 450 ☐ Washington, DC 20001

Project 2 – Incentive Program to Deploy "Near - Zero" Vocational Vehicles in Municipalities

Natural gas transit / airport buses and refuse trucks are some of the most successful markets to date for NGVs. Many municipalities have made significant commitments to expanding their use of natural gas vocational vehicles in an effort to lower fuel costs and take advantage of the simple emission control technology (compared to diesel) deployed on natural gas trucks. Many major cities throughout the country operate natural gas fleets and many are seeking to replace aging vehicles. A program aimed at deploying new "Near - Zero" powered transit and refuse vehicles in municipal fleets, including their contracted carriers and franchise operators, would reduce NOx emissions in areas with air quality problems and could take advantage of existing refueling infrastructure. To provide the most significant overall emissions benefit this program could also target non - attainment areas and provide a range of cash buy down incentives toward refuse trucks and transit buses powered by "Near - Zero" technology.

Project 3 – Deploy "Near - Zero" HD Vehicles in the Volkswagen Fleet for Parts/Goods Movement

Volkswagen ships parts, components and finished vehicles across North America. The fleet of vehicles used to conduct these operations has significant emissions that could be dramatically lowered by deploying vehicles with "Near - Zero" technology. Furthermore, these vehicles could also take advantage of renewable natural gas (biomethane) to reduce overall GHG emissions by 95% or greater. The combination of "Near - Zero" technology for NOx and biomethane for GHG would deliver an overall emissions profile cleaner than electric vehicles (factoring in upstream emissions) in most areas and would be the

cleanest shipping fleet in the country. Other automotive companies have begun to deploy natural gas trucks either directly into fleets that they operate, or through requirements they negotiate with their contract carriers. FCA is operating 179 natural gas trucks between its facilities in Detroit and Canada to deliver parts for its automotive factories. Toyota and Honda have deployed natural gas trucks regionally to deliver components and vehicles. However, no automaker has currently deployed "Near Zero" technology or biomethane as a central part of their strategy. This project offers a significant opportunity to reduce NOx and GHG emissions with the cleanest fleet in North America.

Sent: Mon 4/11/2016 2:26:06 PM
Subject: FW: Timely guidance

Office of Air Quality Planning and Standards

Rules / Guidances / Memoranda Released Since 2010 Related to Implementation of the NAAQS and NSR and Title V Permitting

Revised: April 11, 2016

Date

Title

File

NAAQS Implementation

NO2

2/17/12

Air Quality Designations for the 2010 Primary Nitrogen Dioxide (NO2) National Ambient Air Quality Standards (Final – 77 FR 9532; signed 1/20/12)

<http://www.gpo.gov/fdsys/pkg/FR-2012-02-17/pdf/2012-3150.pdf>

Abstract: This final rule establishes air quality designations for all areas in the United States for the 2010 Primary NO2 NAAQS.

11/24/14

Findings of Failure to Submit a Complete State Implementation Plan for Section 110(a) Pertaining to the 2010 Nitrogen Oxide (NO2) Primary National Ambient Air Quality Standard (Final – 79 FR 69769; signed 11/14/14)

<http://www.gpo.gov/fdsys/pkg/FR-2014-11-24/pdf/2014-27679.pdf>

Abstract: This final rule takes action finding that the District of Columbia and seven states have not submitted complete ISIPs that provide the basic CAA program elements necessary to implement the 2010 NO2 primary NAAQS.

SO2

3/24/11

Area Designations for the 2010 Revised Sulfur Dioxide National Ambient Air Quality Standards

<http://www3.epa.gov/airquality/sulfurdioxide/pdfs/20110411so2designationsguidance.pdf>

Abstract: This memorandum provides information on the schedule and process for designating areas for the purpose of implementing the 2010 revised primary SO2 NAAQS.

11/7/11

Final Response to Petition from New Jersey Regarding SO2 Emissions from the Portland Generating Station (Final – 76 FR 6952; signed 10/31/11)

<http://www.state.nj.us/dep/baqp/petition/EPA.pdf>

Abstract: The EPA is making a finding that the coal-fired Portland Generating Station (Portland), owned and operated by GenOn REMA LLC (GenOn), in Upper Mount Bethel Township, Northampton County, Pennsylvania, is emitting air pollutants in violation of the interstate transport provisions of the CAA. Specifically, the EPA finds that emissions of SO2 from Portland significantly contribute to nonattainment and interfere with maintenance of the 1-hour SO2 NAAQS in New Jersey. This finding is made in response to a petition submitted by the NJDEP on 9/17/10. In this action, the EPA is establishing emission limitations and compliance schedules to ensure that Portland will eliminate its significant contribution to nonattainment and interference with maintenance of the 1-hour SO2 NAAQS in New Jersey. Compliance with these limits will permit the continued operation of Portland beyond the 3-month limit established by the CAA for sources subject to a contribution finding.

2/6/13

Next Steps for Area Designations and Implementation of the Sulfur Dioxide National Ambient Air Quality Standard

<http://www3.epa.gov/airquality/sulfurdioxide/pdfs/20130207SO2StrategyPaper.pdf>

Abstract: This paper describes the EPA's updated strategy for completing initial area designations under the June 2010 1 - hour primary SO2 NAAQS.

8/5/13

Air Quality Designations for the 2010 Sulfur Dioxide Primary National Ambient Air Quality Standard (Final – 78 FR 47191; signed 6/25/13)

<http://www.gpo.gov/fdsys/pkg/FR-2013-08-05/pdf/2013-18835.pdf>

Abstract: This final rule establishes air quality designations for certain areas in the United States for the 2010 primary SO₂ NAAQS.

4/23/14

Guidance for 1-Hour SO₂ Nonattainment Area SIP Submissions

<http://www3.epa.gov/airquality/sulfurdioxide/pdfs/20140423guidance.pdf>

Abstract: The purpose of this memorandum is to distribute a non-binding guidance titled, "Guidance for 1-Hour SO₂ Nonattainment Area SIP Submissions." The document is intended to provide guidance and recommendations to state, local and tribal governments for the development of SIPs and TIPs under the 2010 1-hour primary SO₂ NAAQS.

3/20/15

Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standards

<http://www3.epa.gov/airquality/sulfurdioxide/pdfs/20150320SO2designations.pdf>

Abstract: This memorandum contains revised guidance for developing updates to state recommendations for initial area designations for the 2010 SO₂ NAAQS in accordance with court-ordered schedule for issuing all initial area designations by December 31, 2020. Includes new recommendations for developing and using modeling results to determine if air quality in a specific area meets or does not meet the NAAQS.

8/21/15

Data Requirements Rule for 1-hr Sulfur Dioxide (SO₂) Primary National Ambient Air Quality Standard (Final – 80 FR 50152; signed 8/10/15)

<http://www.gpo.gov/fdsys/pkg/FR-2015-08-21/pdf/2015-20367.pdf>

Abstract: The final rule directs state and tribal air agencies (air agencies) to provide data to characterize current air quality in areas with large sources of sulfur dioxide (SO₂) emissions to identify maximum 1-hour SO₂ concentrations in ambient air. The final rule establishes minimum criteria for identifying the emissions sources and associated areas for which air agencies are required to characterize SO₂ air quality. Air agencies remain free to also characterize air quality in additional areas beyond those required to be characterized under the rule. The final rule also sets forth a process and timetables by which air agencies must characterize air quality through ambient monitoring and/or air quality modeling techniques and submit such data to the EPA. The EPA has issued separate non-binding draft technical assistance documents recommending how air agencies should conduct such monitoring or modeling. The air quality data developed by air agencies pursuant to this rule may be used by the EPA in future actions to evaluate areas' air quality under the 2010 1-hour SO₂ National Ambient Air Quality Standard (NAAQS), including area designations and redesignations, as appropriate.

3/18/16

Findings of Failure to Submit State Implementation Plans Required for Attainment of the 2010 1-Hour Primary Sulfur Dioxide National Ambient Air Quality Standards (Final – 81 FR 14736; signed 3/10/16)
Correction Notice (Final – publication TBD; signed 3/8/16)

<https://www.gpo.gov/fdsys/pkg/FR-2016-03-18/pdf/2016-06063.pdf>

Abstract: This action finds that several states failed to submit SIPs to satisfy certain nonattainment area planning requirements of the CAA for the 2010 1-hour primary SO₂ NAAQS.

PM

4/16/13

Initial Area Designations for the 2012 Revised Primary Annual Fine Particulate National Ambient Air Quality Standards

<http://www3.epa.gov/pmdesignations/2012standards/docs/april2013guidance.pdf>

Abstract: This memorandum provides information on the schedule and process for initially designating areas for the purposes of implementing the 2012 revised PM_{2.5} NAAQS.

6/2/14

Identification of Nonattainment Classification and Deadlines for Submission of State Implementation Plan Provisions for the 97 Fine Particle (PM_{2.5}) NAAQS and 2006 PM_{2.5} NAAQS (Final – 79 FR 31566; signed 4/25/14)

<http://www.gpo.gov/fdsys/pkg/FR-2014-06-02/pdf/2014-10395.pdf>

Abstract: This final rule identifies the classification under subpart 4 for areas currently designated nonattainment for the 1997 and/or 2006 PM_{2.5} standards, the deadlines for states to submit attainment-related and NNSR SIP elements required for these areas pursuant to subpart 4, and the EPA guidance

that is currently available regarding subpart 4 requirements.

1/15/15

Air Quality Designations for the 2012 Primary Annual Fine Particle (PM_{2.5}) National Ambient Air Quality Standards (NAAQS); Final Rule (Final – 80 FR 2206; signed 12/18/14)

<http://www.gpo.gov/fdsys/pkg/FR-2015-01-15/pdf/2015-00021.pdf>

Abstract: This final rule establishes air quality designations for most areas in the U.S., including areas of Indian country, for the 2012 primary PM_{2.5} NAAQS.

3/23/15

Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements (NPRM – 80 FR 15340; signed 3/10/15)

<http://www.gpo.gov/fdsys/pkg/FR-2015-03-23/pdf/2015-06138.pdf>

Abstract: This rule proposes requirements that state, local and tribal air agencies would have to meet as they implement the current and future national ambient air quality standards (NAAQS) for fine particulate matter (PM_{2.5}).

4/7/15

Additional Air Quality Designations and Technical Amendment to Correct Inadvertent Error in Air Quality Designations for the 2012 Primary Annual Fine Particle (PM_{2.5}) National Ambient Air Quality Standards (NAAQS) (Final – 80 FR 18535; signed 3/31/15)

<http://www.gpo.gov/fdsys/pkg/FR-2015-04-07/pdf/2015-07948.pdf>

Abstract: This rule establishes initial area designations for 5 areas that were deferred in the January 18, 2015 notice, and changes the initial designations from 'nonattainment' to 'unclassifiable/attainment' or 'unclassifiable' for 5 areas based on state-submitted early-certified 2014 monitoring data showing that air quality meets the NAAQS. Effective date of designations is April 15, 2015.

7/29/15

Air Quality Designations for the 2006 24-Hour Fine Particle National Ambient Air Quality Standards (2006 24-hour PM_{2.5} NAAQS), 1997 Annual PM_{2.5} NAAQS, and 1987 Annual Coarse Particle (PM₁₀) NAAQS; Technical Amendments to Inadvertent Error (Final – 80 FR 45067; signed 7/21/15)

<http://www.gpo.gov/fdsys/pkg/FR-2015-07-29/pdf/2015-18532.pdf>

Abstract: This final action makes technical amendments to address several minor, inadvertent and nonsubstantive errors in the regulatory text establishing the air quality designations for the 2006 24-hour fine particle (PM_{2.5}) National Ambient Air Quality Standards (NAAQS), 1997 annual PM_{2.5} NAAQS, and 1987 annual coarse particle (PM₁₀) NAAQS. The states to which these amendments apply are New York and West Virginia.

3/17/16

Information on the Interstate "Good Neighbor" Provision for the 2012 Fine Particulate Matter National Ambient Air Quality Standards under Clean Air Act Section 110(a)(2)(D)(i)(1)

<https://www3.epa.gov/airquality/particlepollution/pdfs/good-neighbor-memo.pdf>

Abstract: This memorandum provides information to the EPA Regional Offices and the states as they develop and review SIPs that address the interstate transport provision of the CAA section 110(a)(2)(D)(i)(1) otherwise known as the "Good Neighbor" provision, as it pertains to the 2012 PM_{2.5} NAAQS.

Ozone

9/22/11

Implementation of the Ozone National Ambient Air Quality Standard

<http://www3.epa.gov/airquality/ozonepollution/pdfs/OzoneMemo9-22-11.pdf>

Abstract: The purpose of this memorandum is to clarify for state and local air agencies the status of the 2008 ozone NAAQS and to outline implementation steps moving forward.

5/21/12

Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards (Final – 77 FR 30088; signed 4/30/13)

<http://www.gpo.gov/fdsys/pkg/FR-2012-05-21/pdf/2012-11618.pdf>

Abstract: This rule establishes initial air quality designations for most areas in the United States, including areas of Indian country, for the 2008 primary and secondary national ambient air quality standards (NAAQS) for ozone.

5/21/12

Implementation of the 2008 National Air Quality Standards for Ozone: Nonattainment Area Classifications

Approach, Attainment Deadlines and Revocation of the 1997 Ozone Standards for Transportation Conformity Purposes (Final – 77 FR 30160; signed 4/30/13)

<http://www.gpo.gov/fdsys/pkg/FR-2012-05-21/pdf/2012-11605.pdf>

Abstract: This final rule establishes air quality thresholds that define the classifications assigned to all nonattainment areas for the 2008 ozone NAAQS which were promulgated on 3/12/08.

6/11/12

Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards for Several Counties in Illinois, Indiana, and Wisconsin; Correction to Inadvertent Errors in Prior Designations (Final – 77 FR 34221; signed 5/31/12)

<http://www.gpo.gov/fdsys/pkg/FR-2012-06-11/pdf/2012-14097.pdf>

Abstract: This final rule completes the initial air quality designations for the 2008 primary and secondary NAAQS for ozone.

1/22/15

Information on the Interstate Transport “Good Neighbor” Provision for the 2008 Ozone National Ambient Air Quality Standards (NAAQS) under Clean Air Act (CAA) Section 110(a)(2)(D)(i)(I)

<http://www3.epa.gov/airtransport/GoodNeighborProvision2008NAAQS.pdf>

Abstract: This memorandum is to provide information to states regarding SIPs to address the interstate transport “Good Neighbor” Provision of the CAA as it pertains to the 2008 ozone NAAQS.

3/6/15

Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule (Final – 80 FR 12264; signed 2/13/15)

<http://www.gpo.gov/fdsys/pkg/FR-2015-03-06/pdf/2015-04012.pdf>

Abstract: This final rule establishes a final rule for implementing the 2008 ozone NAAQS that were promulgated on March 12, 2008.

7/13/15

Findings of Failure to Submit a Section 110 State Implementation Plan for Interstate Transport for the 2008 National Ambient Air Quality Standards for Ozone (Final Rule – 80 FR 3991; Signed 6/30/15)

<http://www.gpo.gov/fdsys/pkg/FR-2015-07-13/pdf/2015-16922.pdf>

Abstract: This final rule finds that 24 states have failed to submit infrastructure State Implementation Plans (SIPs) to satisfy certain interstate transport requirements of the Clean Air Act (CAA) with respect to the 2008 8-hour ozone national ambient air quality standard (NAAQS). Specifically, these requirements pertain to significant contribution to nonattainment, or interference with maintenance, of the 2008 8-hour ozone NAAQS in other states. These findings of failure to submit establish a 2-year deadline for the EPA to promulgate a Federal Implementation Plan (FIP) to address the interstate transport SIP requirements pertaining to significant contribution to nonattainment and interference with maintenance unless, prior to the EPA promulgating a FIP, the state submits, and the EPA approves, a SIP that meets these requirements.

8/4/15

Notice of Availability of the Environmental Protection Agency’s

Updated Ozone Transport Modeling Data for the 2008 Ozone

National Ambient Air Quality Standard (NAAQS) (NOA – 80 FR 46271; 7/23/15)

<http://www.gpo.gov/fdsys/pkg/FR-2015-08-04/pdf/2015-18878.pdf>

Abstract: This notice provides notice that interstate ozone transport modeling and associated data and methods are available for public review and comment. These data and methods will be used to inform a rulemaking proposal that the EPA is developing and expects to release later this year to address interstate ozone transport for the 2008 ozone NAAQS. This notice also meets the EPA’s expressed intent to update the air quality modeling data that were released on 1/22/15, and to share the updated data with states and other stakeholders.

10/1/15

Implementing the 2015 Ozone National Ambient Air Quality Standards

<http://www3.epa.gov/ozonepollution/pdfs/20151001memo.pdf>

Abstract: This document highlights many of the issues related to implementing the revised national ozone standards, including policy and technical aspects of implementation that EPA anticipates facing in the coming years. It also outlines actions that the EPA will take and our expectations of our air agency partners.

12/3/15

Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS (NPRM Rule – 80 FR 75706; Signed 11/16/15)

<https://www.gpo.gov/fdsys/pkg/FR-2015-12-03/pdf/2015-29796.pdf>

Abstract: This rule proposes an update to the Cross-State Air Pollution Rule (CSAPR) FIPs for the 2008 ozone National Ambient Air Quality Standards (NAAQS). Starting in 2017, this proposal would reduce summertime nitrogen oxides (NOX) emissions from power plants in 23 states in the eastern U.S.

2/25/16

Area Designations for the 2015 Ozone National Ambient Air Quality Standards

<https://www.gpo.gov/fdsys/pkg/FR-2016-03-01/pdf/2016-04468.pdf>

Abstract: This guidance provides information on the schedule and process for initially designating areas for the purpose of implementing the 2015 primary and secondary ozone NAAQS.

3/___/16

Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Several Areas Classified As Marginal for the 2008 Ozone National Ambient Air Quality Standards (Final – publication to be determined; Signed 3/___/16)

Abstract: This rule takes final action on three separate and independent types of determinations for each of the 36 areas that are currently classified as “Marginal” for the 2008 ozone NAAQS. First, the EPA is determining that 17 areas attained the 2008 ozone NAAQS by the applicable attainment date of July 20, 2015, based on complete, quality-assured and certified ozone monitoring data for 2012-2014. Second, the EPA is granting 1-year attainment date extensions for eight areas on the basis that the requirements for such extensions under the CAA and the EPA’s implementing regulations have been met. Third, the EPA is determining that 11 areas failed to attain the 2008 ozone NAAQS by the applicable attainment date of July 20, 2015, and thus are reclassified by operation of law as “Moderate” for the 2008 ozone NAAQS. States containing any or any portion of these new Moderate areas must submit SIP revisions that meet the statutory and regulatory requirements that apply to 2008 ozone nonattainment areas classified as Moderate by January 1, 2017.

Lead

11/22/10

Air Quality Designations for the 2008 Lead (Pb) National Ambient Air Quality Standards (Final – 75 FR 71033; signed 11/16/10)

<http://www.gpo.gov/fdsys/pkg/FR-2010-11-22/pdf/2010-29405.pdf>

Abstract: This final rule establishes air quality designations for certain areas in the United States for the 2008 Pb NAAQS.

7/8/11

2008 Lead (Pb) National Ambient Air Quality Standards (NAAQS) Implementation Questions and Answers

<http://www3.epa.gov/airquality/lead/pdfs/20110708QAguidance.pdf>

Abstract: This document addresses issues the EPA has received from the Regional Offices, states and industry. The document provides guidance and additional clarification that will be helpful for the Attainment Demonstration SIPs that were due 6/30/12, for the first round of designations and 6/30/13, for the second round of designations.

11/22/11

Air Quality Designations for the 2008 Lead (Pb) National Ambient Air Quality Standards (Final – 76 FR 72097; signed 11/8/11)

<http://www.gpo.gov/fdsys/pkg/FR-2011-11-22/pdf/2011-29460.pdf>

Abstract: This final rule establishes air quality designations for most areas in the United States for the 2008 Pb NAAQS.

3/2012

Implementation of the 2008 Lead National Ambient Air Quality Standards – Guide to Developing Reasonably Available Control Measures (RACM) for Controlling Lead Emissions

<http://www3.epa.gov/airquality/lead/pdfs/2012ImplementationGuide.pdf>

Abstract: In order to support the implementation of the 2008 Pb NAAQS, this document contains an analysis of air control measures for the purpose of determining what controls may constitute RACM, including RACT, for controlling lead emissions pursuant to Section 172(c)(1) of the CAA.

8/10/12

Addendum to the 2008 Lead NAAQS Implementation Questions and Answers Signed on July 11, 2011, by Scott Mathias

<http://www3.epa.gov/airquality/lead/pdfs/20120810qanda.pdf>

Abstract: Addendum to the 2008 Lead NAAQS Implementation Questions and Answers dated 7/8/11 (above) - signed on July 11, 2011, by Scott Mathias.

1/5/15

National Ambient Air Quality Standards for Lead (NPRM – 80 FR 278; signed 12/19/14)

<http://www.gpo.gov/fdsys/pkg/FR-2015-01-05/pdf/2014-30681.pdf>

Abstract: The EPA is proposing to retain the current standards, without revisions.

Modeling/Monitoring

12/21/10

Methods for Measurement of Filterable PM₁₀ and PM_{2.5} and Measurement of Condensable PM Emissions From Stationary Sources; Final Rule (Final Rule – 75 FR 80118; signed 12/1/10)

<http://origin.www.gpo.gov/fdsys/pkg/FR-2010-12-21/pdf/2010-30847.pdf>

Abstract: This final rule promulgates amendments to Methods 201A and 202.

6/2012

Near-Road NO₂ Monitoring Technical Assistance Document

<http://www3.epa.gov/ttnamti1/files/nearroad/NearRoadTAD.pdf>

Abstract: This document is the June 2012 release of the Near-Road NO₂ Monitoring TAD. The TAD was developed to aid state and local air monitoring agencies in the implementation of required near-road NO₂ monitoring stations.

3/14/13

Revision to Ambient Nitrogen Dioxide Monitoring Requirements (Final Rule – 78 FR 16184; signed 3/7/13)

<http://www.gpo.gov/fdsys/pkg/FR-2013-03-14/pdf/2013-05939.pdf>

Abstract: This final rule revises the deadlines established in the NAAQS for NO₂ for the near-road component of the NO₂ monitoring network in order to implement a phased deployment approach. This approach will create a series of deadlines that will make the near-road NO₂ network operational between 1/1/14, and 1/1/17. The EPA is also finalizing revisions to the approval authority for annual monitoring network plans for NO₂ monitoring.

12/21/13

Draft SO₂ Modeling Technical Assistance Document

<http://www3.epa.gov/airquality/sulfurdioxide/pdfs/SO2ModelingTAD.pdf>

Abstract: This draft document is provided by the EPA to assist state, local, and tribal air agencies in the characterization of ambient air quality in areas with significant SO₂ emission sources either through ambient monitoring or dispersion modeling as outlined in the expected data requirements rule. Revised January 2014.

12/2013

Draft Source-Oriented SO₂ Monitoring TAD

<http://www3.epa.gov/airquality/sulfurdioxide/pdfs/SO2MonitoringTAD.pdf>

Abstract: The primary purpose of this draft Source-Oriented SO₂ Monitoring TAD is to provide suggestions on how air agencies might appropriately and sufficiently monitor ambient air in proximity to an SO₂ emission source to create ambient monitoring data for comparison to the SO₂ NAAQS. Revised January 2014.

4/16/14

Enhancements, “bug fixes” and other modifications to AERMOD Dispersion Model

http://www3.epa.gov/ttn/scram/models/aermod/AERMOD_MCB10_table.pdf

Abstract: MCB 10 AERMOD version 14134 changes by change type.

9/30/14

Guidance Memorandum: Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO₂ National Ambient Air Quality Standard

http://www3.epa.gov/scram001/guidance/clarification/NO2_Clarification_Memo-20140930.pdf

Abstract: This guidance addresses NSR/PSD modeling compliance demonstrations for NO₂ NAAQS and the approval and use of the new Tier 2 Ambient Ratio Method 2 (ARM2) and various aspects of the application of the Tier 3 approaches of OLM and PVMRM.

12/3/14

Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze

http://www3.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf

Abstract: The EPA is providing a draft revised version of Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5 and Regional Haze to the state and local agencies as well as the public for consideration review and comment. Comments are due 3/13/15.

7/29/15

Revision to the Guideline on Air Quality Models: Enhancements to the AERMOD Dispersion Modeling System and Incorporation of Approaches To Address Ozone and Fine Particulate Matter; Proposed Rule

Sep<

<http://www.gpo.gov/fdsys/pkg/FR-2015-07-29/pdf/2015-18075.pdf>

Abstract: This proposal proposes to revise the Guideline on Air Quality Models ("Guideline"). The Guideline has been incorporated into EPA's regulations, satisfying a requirement under the CAA section 165(e)(3) for the EPA to specify, with reasonable particularity models to be used in the PSD program.

PSD, NNSR and Title V Permitting

3/23/10

Modeling Procedures for Demonstrating Compliance with PM2.5 NAAQS

<http://www2.epa.gov/sites/production/files/2015-07/documents/pm25memo.pdf>

Abstract: This memorandum addresses the need for recommendations regarding appropriate dispersion modeling procedures which can be used to demonstrate compliance with PM2.5 NAAQS.

04/01/10

Applicability of the Federal Prevention of Significant Deterioration Permit Requirements to New and Revised National Ambient Air Quality Standards

http://cdn.ca9.uscourts.gov/datastore/library/2014/09/10/Sierra_Ambient.pdf

Abstract: This memorandum responds to inquiries that the EPA received from parties who are currently developing or reviewing applications for PSD permits under the CAA requesting that the OAR provide guidance on the applicability of PSD permitting requirements to a newly promulgated or revised NAAQS or standards.

6/29/10

Guidance Concerning the Implementation of the 1-hour NO2 NAAQS for the Prevention of Significant Deterioration Program

http://www.co.shasta.ca.us/docs/Resource_Management/spi-feir/1_Exhibit_D.pdf?sfvrsn=0

Abstract: This memorandum clarifies the applicability of current guidance in the Guideline on Air Quality Models for modeling NO2 impacts in accordance with the PSD permit requirements to demonstrate compliance with the new 1-hour NO2 standard. This guidance includes two attached memoranda addressing both guidance for the preparation and review of PSD permits with respect to the 1-hour standard and specific modeling guidance for estimating ambient NO2 concentrations and determining compliance with the new 1-hour NO2 standard.

11/10/10

PSD and Title V Permitting Guidance for Greenhouse Gases (Technical correction issued 3/2011)

<http://www3.epa.gov/nsr/ghgdocs/ghgpermittingguidance.pdf>

Abstract: This document assists permit writers and permit applicants in addressing the prevention of significant deterioration (PSD) and title V permitting requirements for greenhouse gases (GHGs) that began to apply on January 2, 2011. This document: (1) describes, in general terms and through examples, the requirements of the PSD and title V permit regulations; (2) reiterates and emphasizes relevant past EPA guidance on the PSD and title V review processes for other regulated air pollutants; and (3) provides additional recommendations and suggested methods for meeting the permitting requirements for GHGs, which are illustrated in many cases by examples.

3/1/11

Additional Clarification Regarding Applicability of Appendix W Modeling Guidance for the 1-hour NO2 NAAQS

http://www3.epa.gov/scram001/guidance/clarification/Additional_Clarifications_AppendixW_Hourly-NO2-NAAQS_FINAL_03-01-2011.pdf

Abstract: This memorandum supplements the 6/28/10 guidance memo by providing further clarification

and guidance on the application of Appendix W guidance for the 1-hour NO₂ standard. The memo itself referenced a 6/29/10 guidance memo in error.

4/11/11

Clarification on AERSCREEN as recommended screening model

http://www3.epa.gov/scram001/guidance/clarification/20110411_AERSCREEN_Release_Memo.pdf

Abstract: AERSCREEN has been released and is available on the SCRAM website. AERSCREEN is based on AERMOD, EPA's preferred near-field dispersion model and replaces SCREEN3 as the recommended screening model based on the Guideline on Air Quality Models.

7/21/11

Revised Policy to Address Reconsideration of Inter-pollutant Trading Provisions for Fine Particles (PM_{2.5})

<http://www3.epa.gov/scram001/guidance/clarification/pm25trade.pdf>

Abstract: The purpose of this memorandum is to announce a change in the policy that the EPA originally set forth in the 2008 PM_{2.5} NSR Implementations Rule (the 2008 final rule) concerning the development and adoption of interpollutant trading (offset) provisions for PM_{2.5} under state NNSR programs for PM_{2.5}.

10/15/12

Timely Processing of Prevention of Significant Deterioration (PSD) Permits when EPA or a PSD-Delegated Air Agency Issues the Permit

<http://www2.epa.gov/sites/production/files/2015-07/documents/timely.pdf>

Abstract: This memorandum clarifies expectations and responsibilities regarding the processing of PSD permit applications when an EPA Regional Office or a PSD-delegated air agency issues the PSD permit.

4/17/13

Minor New Source Review Program Public Notice Requirements under 40 CFR 51.161(b)(3)

<http://www2.epa.gov/sites/production/files/2015-07/documents/pubnot.pdf>

Abstract: The purpose of this memorandum is to clarify the Agency's position on what constitutes prominent advertisement for minor sources under our permitting regulations at 40 CFR 51.161.

3/8/13

Use of ASOS Meteorological Data in AERMOD Dispersion Modeling

http://www3.epa.gov/scram001/guidance/clarification/20130308_Met_Data_Clarification.pdf

Abstract: The purpose of this memorandum is to provide some background information related to the transition to ASOS and to address more recent developments and potential issues associated with the use of NWS meteorological data for dispersion modeling.

12/9/13

Prevention of Significant Deterioration for Particulate Matter Less Than 2.5 Micrometers – Significant Impact Levels and Significant Monitoring Concentration: Removal of Vacated Elements (Final Rule - 78 FR 73698; signed 11/26/13)

<http://www.gpo.gov/fdsys/pkg/FR-2013-12-09/pdf/2013-29196.pdf>

Abstract: On 1/22/13, the United States Court of Appeals for the District of Columbia Circuit (the Court) granted a request from the EPA to vacate and remand to the EPA portions of two PSD regulations, promulgated in 2010 under the authority of the CAA, regarding the SILs for PM_{2.5}. The Court further vacated the portions of the PSD regulations establishing a PM_{2.5} SMC. The EPA amended its regulations to remove the vacated PM_{2.5} SILs and SMC provisions from the PSD regulations in the CFR. This action was exempt from notice-and-comment rulemaking because it is ministerial in nature. The EPA will initiate a separate rulemaking in the future regarding the PM_{2.5} SILs that will address the Court's remand. The final rule was effective on 12/9/13.

12/16/13

AERMOD Modeling System Updates: Improvements to beta "Low wind Speed" options, updated NO₂ tier 2 Ambient Ratio Method, added directionally varying monitored background concentrations capability, and other bug fixes.

http://www3.epa.gov/ttn/scram/models/aermod/aermod_mcb9.txt

Abstract: Model change Bulleting (MCB) #9 documents and describes changes made to the AERMOD Dispersion Model.

1/31/14

Guidance on Extension of Prevention of Significant Determination (PSD) Permits under 40 CFR

52.21(r)(2)

<http://www2.epa.gov/sites/production/files/2015-07/documents/extend14.pdf>

Abstract: The purpose of this memorandum is to clarify the EPA's views on what constitutes adequate justification for an extension of the 18-month timeframe for commencing construction of a source that has been granted a preconstruction permit under the PSD provisions of part C of title I of the CAA.

4/8/14

Interim Guidance on the Treatment of Condensable Particulate Matter Test Results in the Prevention of Significant Deterioration and Nonattainment New Source Review Permitting Programs

<http://www3.epa.gov/ttnemc01/methods/psdnsrinterimcmprmemo4814.pdf>

Abstract: This memorandum provides interim guidance on the treatment of CPM under the EPA's NSR permit programs for PM.

4/30/14

Implementation Guidance on Annual Compliance Certification Reporting and Statement of Basis Requirements for Title V Operating Permits

http://www3.epa.gov/air/tribal/pdfs/Memo_OAR_14_000_8602_Guidance%20on%20Annual%20Compliance%20Cert.%20Reporting%20and%20Statement%20Title%20V.pdf

Abstract: This memorandum and attachments provide guidance on satisfying the CAA title V annual compliance certification reporting and statement of basis requirements. It addresses two outstanding recommendations made by the OIG in the report titled, "Substantial Changes Needed in Implementation and Oversight of Title V Permits if Program Goals are to be Fully Realized," (OIG Report No. 2005-P-00010).

5/20/14

Guidance for PM2.5 Permit Modeling

http://www3.epa.gov/scram001/guidance/guide/Guidance_for_PM25_Permit_Modeling.pdf

Abstract: This memorandum and attachment, titled "Guidance for PM2.5 Permit Modeling," provides guidance on demonstrating compliance with PM2.5 NAAQS and PSD increments, especially with regard to considerations of the secondarily formed component of PM2.5.

7/24/14

Next Steps and Preliminary Views on the Application of Clean Air Act Permitting Programs to Greenhouse Gases Following the Supreme Court's Decision in Utility Air Regulatory Group v. Environmental Protection Agency

<http://www3.epa.gov/nsr/documents/20140724memo.pdf>

Abstract: This memorandum provides guidance on how we interpret the UARG v EPA Supreme Court decision, especially with regard to the portion of the PSD and title V GHG permitting regulations that the Supreme Court determined was no longer required.

9/29/14

Amendments to Compliance Certification Content Requirements for State and Federal Operating Permits Programs (Final – 79 FR 43661; signed 7/21/14)

<http://www.gpo.gov/fdsys/pkg/FR-2014-07-28/pdf/2014-17680.pdf>

Abstract: This final rule amends the compliance certification provisions to restore a sentence removed by error in a previous amendment. The June 27, 2003, final rule that amended the Compliance Certification Requirements language inadvertently omitted a sentence.

12/19/14

Next Steps for Addressing EPA-Issued Step 2 Prevention of Significant Deterioration Greenhouse Gas Permits and Associated Requirements

http://www3.epa.gov/nsr/ghgdocs/Step2PermitRescissionMemoFinal_12-19-14.pdf#_ga=1.59215274.68043026.1426172912

Abstract: This memorandum addresses questions from the regional office on how to proceed on PSD permits issued by the EPA under Step 2 of the Tailoring Rule after the U.S. Supreme Court decision in UARG v. EPA [134 S. Ct. 2427 (2014)] and other questions related to Step 2 PSD permits issued by the EPA.

12/19/14

No Action Assurance Regarding EPA-Issued Step 2 Prevention of Significant Deterioration Permits and Related Title V Requirements Following Utility Air Regulatory Group v. Environmental Protection Agency

<http://www2.epa.gov/sites/production/files/2014-12/documents/oecanaamemo-121914.pdf>

Abstract: This memorandum provided further information on how EPA intends to proceed regarding EPA-issued Step 2 PSD permits and intention to undertake a rulemaking action that will allow the agency to rescind any Step 2 PSD permits that it issued under the regulations the Supreme Court held to be invalid.

5/7/2015

Prevention of Significant Deterioration Permitting for Greenhouse Gases; Providing Option for Rescission of EPA-Issued Tailoring Rule Step 2 Prevention of Significant Deterioration Permits (Direct Final – 80 FR 26183; Parallel Proposal – 80 FR 26210; signed 4/30/15)

<http://www.gpo.gov/fdsys/pkg/FR-2015-05-07/pdf/2015-10628.pdf>

<http://www.gpo.gov/fdsys/pkg/FR-2015-05-07/pdf/2015-10629.pdf>

Abstract: This direct final with parallel proposal amends the federal PSD program regulations to allow for rescission of certain PSD permits issued by the EPA and delegated reviewing authorities under Step 2 of the PSD and title V Greenhouse Gas Tailoring Rule. No adverse comments were received on the proposal so the final becomes effective 7/6/15.

5/13/2015

Title V Permit Guidance and Template for the Cross-State Air Pollution Rule

http://www3.epa.gov/crossstaterule/pdfs/CSAPR_Title_V_Permit_Guidance.pdf

Abstract: This memorandum transmitted title V guidance, which includes a template, for the incorporation of the CSAPR applicable requirements into title V permits. Issuance of this guidance is consistent with the EPA's statements in the CSAPR preamble to assist permitting authorities in implementing CSAPR applicable requirements.

8/19/15

Prevention of Significant Deterioration and Title V Permitting for Greenhouse Gases: Removal of Certain Vacated Elements (Final –

80 FR 50199; signed 8/12/15)

<http://www.gpo.gov/fdsys/pkg/FR-2015-08-19/pdf/2015-20501.pdf>

Abstract: This final rule amends its PSD and title V regulations to remove from the CFR portions of those regulations that were initially promulgated in 2010 and that the D.C. Circuit specifically identified as vacated in the 4/10/15, amended judgment, Coalition for Responsible Regulation v. EPA.

9/18/15

Source Determination for Certain Emission Units in the Oil and Natural Gas Sector (NPRM – 80 FR 56579; signed 8/18/15)

<http://www.gpo.gov/fdsys/pkg/FR-2015-09-18/pdf/2015-21026.pdf>

Abstract: This proposal is proposing to clarify the term “adjacent” in the definitions of: (1) “building, structure, facility or installation” used to determine the “stationary source” for purposes of the Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) programs and (2) “major source” in the title V program as applied to the oil and natural gas sector.

12/29/15

Revisions to the Public Notice Provisions in Clean Air Act Permitting Programs (NPRM – 80 FR 81234; signed 12/21/15)

<https://www.gpo.gov/fdsys/pkg/FR-2015-12-29/pdf/2015-32639.pdf>

Abstract: This proposal is proposing to revise the public notice rule provisions for the NSR, title V and OCS permit programs of the CAA and COA determinations for implementation of the OCS air quality regulations.

1/12/16

Clean Air Act Section 185 Fee Rates for Calendar Years 1990 – 2015

Abstract: This mem provides CAA section 185 penalty fee rates (\$/ton of ozone precursor emissions) for year from 1990 to 2015.

Other/Combination of Pollutants

8/23/10

Documentation of Future Year Ozone and Annual PM2.5 Design Values for Monitors in Western States

Abstract: The purpose of the memo is to provide projected future ozone and annual PM2.5 design values for monitors in the Western United States based on the air quality modeling in support of EPA's proposed CSAPR. The memo describes how the projected design values can be used to establish which monitors should be further evaluated to determine if emissions from other states will significantly contribute to nonattainment or interfere with maintenance at the sites.

12/20/11

Policy for Establishing Separate Air Quality Designations for Areas of Indian Country

<http://www3.epa.gov/airquality/ozonepollution/designations/2008standards/documents/20120117indiancountry.pdf>

Abstract: This memorandum provides the EPA's policy regarding designating areas of Indian country separately from adjacent areas for the NAAQS.

12/20/11

Guidance to Regions for Working with Tribes during the National Ambient Air Quality Standards (NAAQS) Designations Process

<http://www3.epa.gov/airquality/ozonepollution/designations/2008standards/documents/20120117naaqsguidance.pdf>

Abstract This memorandum provides guidance to the EPA Regional Offices for working with federally-recognized Indian tribes regarding the CAA section 107(d) designations process for Indian country.

6/7/12

Regional Haze: Revisions to Provisions Governing Alternatives to Source-Specific Best Available Retrofit Technology (BART) Determinations, Limited SIP Disapprovals, and Federal Implementation Plans

<http://www.gpo.gov/fdsys/pkg/FR-2012-06-07/pdf/2012-13693.pdf>

Abstract: The EPA is finalizing revisions to our rules pertaining to the regional haze program.

10/2012

Agriculture Air Quality Conservation Measures Reference Guide for Cropping Systems and General Land Management

http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1049502.pdf

Abstract: The EPA and the USDA-NRCS have collaborated to develop this reference guide to provide a compilation of conservation measures for air pollutant emission reductions and/or reduction of air quality impacts from agricultural land management and cropping operations.

4/2013

General Principles for the 5-Year Regional Haze Progress Reports for the Initial Regional Haze State Implementation Plans (Intended to Assist States and EPA Regional Offices in Development and Review of the Progress Reports)

http://www.4cleanair.org/Documents/haze_5year_4-10-13.pdf

Abstract: This document has been developed by the EPA for the EPA Regional Offices and states in preparing and reviewing the 5-year progress reports for the initial regional haze SIPs.

5/10/13

Interim Guidance to Implement Requirements for the Treatment of Air Quality Monitoring Data Influenced by Exceptional Events

<http://www.epa.gov/air-quality-analysis/interim-exceptional-events-guidance-documents>

Abstract: This memorandum and its attachments clarify key provisions of the 2007 EER to respond to questions and issues that have arisen since the rule was promulgated.

9/13/13

Guidance on Infrastructure State Implementation Plan (SIP) Elements Under CAA Sections 110(a)(1) and 110(a)(2)

http://www3.epa.gov/airquality/urbanair/sipstatus/docs/Guidance_on_Infrastructure_SIP_Elements_Multipollutant_FINAL_Sept_2013.pdf

Abstract: The purpose of this memorandum is to distribute non-binding guidance from the US EPA on the requirements of certain provisions of the CAA titled, "Guidance on Infrastructure State Implementation Plan (SIP) Elements under Clean Air Act Sections 110(a)(1) and 110(a)(2)."

12/2013

Examples of Reviewed Exceptional Events Submissions

<http://www.epa.gov/air-quality-analysis/exceptional-events-submissions-table>

Abstract: The exceptional events submission table provides examples of exceptional events submissions, or the decision documents responding to the demonstrations, for various cases of exceptional events that have been reviewed by EPA.

6/9/14

Withdrawal of the Prior Determination or Presumption That Compliance With the CAIR or the NOx SIP Call Constitutes RACT or RACM for the 1997 8-Hour Ozone and 1997 Fine Particle NAAQS (Proposal – 79 FR 32892; signed 5/29/14)

<https://www.cfr-ebooks.com/register/2014/jun/09/2014-13415.pdf>

Abstract: The EPA is proposing to withdraw any prior determination or presumption, for the 1997 8-hour

ozone NAAQS and the 1997 PM2.5 NAAQS, that compliance with the CAIR or the NOx SIP Call automatically constitutes RACT or RACM for NOx or SO2 emission from EGU sources participating in these regional cap-and-trade programs.

11/19/14

Addressing Biogenic Carbon Dioxide Emissions from Stationary Sources

<http://www3.epa.gov/climatechange/downloads/Biogenic-CO2-Emissions-Memo-111914.pdf>

Abstract: The Agency is taking the next step in the development of ongoing technical work it has been doing in understanding the role biomass can play in reducing overall greenhouse gas emissions. The EPA has developed a second draft of the Framework for Assessing Biogenic CO2 Emissions from Stationary Sources, and is preparing to release it for further review. The EPA also anticipates near-term decision-making pertaining to biogenic CO2 emissions in the context of both the CPP and the PSD program. EAs you know, the EPA also anticipates near-term decision-making pertaining to biogenic CO2 emissions in the context of both the CPP and the PSD program. As a result, we expect that many states and stakeholders will look to the second draft of the Framework for indications of how the Agency will treat biogenic CO2 emissions under both the CPP and the PSD program going forward. In addition to advising you of the release of the revised Framework, this memo also describes below OAR's current thinking with respect to those two programs and their treatment of biogenic CO2 emissions. The EPA expects that many states and stakeholders will look to the second draft of the Framework for indications of how the Agency will treat biogenic CO2 emissions under both the CPP and the PSD program going forward. This memo also describes below OAR's current thinking with respect to those two programs and their treatment of biogenic CO2 emissions.

12/2014

Exceptional Events Quick Reference Guide

<http://www.epa.gov/air-quality-analysis/exceptional-events-requirements-reference-guide>

Abstract: The quick reference guide table contains links to information for use in preparing exceptional events demonstrations. Each link points to a specific area in guidance documents, example approved demonstrations or other relevant tools categorized by rule element, event type and pollutant.

2/10/15

Revisions to the Clean Air Act Section 110 Submission Requirements for State Implementation Plans and Notice of Availability of an Option for Electronic Reporting (Final – 80 FR 7336; signed 2/2/15)

<http://www.gpo.gov/fdsys/pkg/FR-2015-02-10/pdf/2015-02602.pdf>

Abstract: This final rule and notice of availability revises the requirements for how state and tribal implementation plans under the CAA are required to be submitted to the EPA.

6/12/15

State Implementation Plan: Response to Petition for Rulemaking Restatement and Update of EPA's SSM Policy Applicable to SIPs; Findings of Substantial Inadequacy; and SIP Calls to Amend Provisions Applying to Excess Emissions During Periods of Startup, Shutdown and Malfunction; Final Rule (Final – 80 FR 33840; signed 5/22/15)

<http://www.gpo.gov/fdsys/pkg/FR-2015-06-12/pdf/2015-12905.pdf>

Abstract: This final rule takes action on a petition for rulemaking filed by the Sierra Club that concerns how provisions in EPA-approved SIPs treat excess emissions during SSM. Further EPA is clarifying, restating and revising its guidance concerning its interpretation of the CAA requirements with respect to treatment in SIPs of excess emissions that occur during periods of SSM.

8/19/15

Amendments to Regional Consistency Regulations (NPRM – 80 FR 50250; signed 8/5/15)

<http://www.gpo.gov/fdsys/pkg/FR-2015-08-19/pdf/2015-20506.pdf>

Abstract: This proposal proposes to revise its Regional Consistency regulations to ensure the EPA has the flexibility necessary to implement CAA programs on a national scale while addressing court rulings that concern certain agency actions under the CAA.

9/2015

Best Communication Practices for Preparation of Exceptional Events Demonstrations

<http://www.epa.gov/sites/production/files/2015-09/documents/bestpractices-exceptionaleventdemonstrationsjuly242015.pdf>

Abstract: This document summarizes the best practices for communication and collaboration between the EPA and air agencies during the identification of exceptional events and the development, submittal and review of exceptional events demonstrations.

10/22/15

Initial Clean Power Plan Submittals under Section 111(d) of the Clean Air Act

<http://www3.epa.gov/airquality/cpptoolbox/cpp-initial-subm-memo.pdf>

Abstract: This memorandum provides assistance and information to states interested in seeking an extension of time in which to develop and submit a final plan under section 111(d) of the CAA.

11/20/15

Treatment of Data Influenced by Exceptional Events – Rule Revisions and Notice of Availability for Related Draft Guidance (NPRM – 80 FR 72840; signed 11/10/15)

<http://www2.epa.gov/air-quality-analysis/proposed-exceptional-events-rule-revisions-and-draft-guidance-0>

Abstract: This proposal proposes to revise certain sections within the March 22, 2007, 2007 Exceptional Events Rule that governs the exclusion of event-affected air quality data from regulatory decisions. The EPA is also providing a notice of availability of a draft version of the non-binding guidance document titled, Draft Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations.

3

Sent: Fri 4/8/2016 9:01:14 PM
Subject: Ozone testimony

I 114TH CONGRESS 2D SESSION H. R. 4775 To facilitate efficient State implementation of ground-level ozone standards, and for other purposes. IN THE HOUSE OF REPRESENTATIVES MARCH 17, 2016 Mr. OLSON (for himself, Mr. FLORES, Mr. SCALISE, Mr. LATTI, Mr. MCCARTHY, and Mr. CUELLAR) introduced the following bill; which was referred to the Committee on Energy and Commerce A BILL To facilitate efficient State implementation of ground-level ozone standards, and for other purposes. Be it enacted by the Senate and House of Representa- 1 tives of the United States of America in Congress assembled, 2 SECTION 1. SHORT TITLE. 3 This Act may be cited as the “Ozone Standards Im- 4 plementation Act of 2016”. 5 SEC. 2. FACILITATING STATE IMPLEMENTATION OF EXIST- 6 ING OZONE STANDARDS. 7 (a) DESIGNATIONS.— 8 (1) DESIGNATION SUBMISSION.—Not later than 9 October 26, 2024, notwithstanding the deadline 10 VerDate Sep 11 2014 04:33 Mar 18, 2016 Jkt 059200 PO 00000 Frm 00001 Fmt 6652 Sfmt 6201 E:\BILLS\H4775.IH H4775 emcdonald on DSK2VPTVN1PROD with BILLS2 •HR 4775 IH specified in paragraph (1)(A) of section 107(d) of 1 the Clean Air Act (42 U.S.C. 7407(d)), the Gov- 2 ernor of each State shall designate in accordance 3 with such section 107(d) all areas (or portions there- 4 of) of the Governor’s State as attainment, nonattain- 5 ment, or unclassifiable with respect to the 2015 6 ozone standards. 7 (2) DESIGNATION PROMULGATION.—Not later 8 than October 26, 2025, notwithstanding the deadline 9 specified in paragraph (1)(B) of section 107(d) of 10 the Clean Air Act (42 U.S.C. 7407(d)), the Adminis- 11 trator shall promulgate final designations under 12 such section 107(d) for all areas in all States with 13 respect to the 2015 ozone standards, including any 14 modifications to the designations submitted under 15 paragraph (1). 16 (3) STATE IMPLEMENTATION PLANS.—Not 17 later than October 26, 2026, notwithstanding the 18 deadline specified in section 110(a)(1) of the Clean 19 Air Act (42 U.S.C. 7410(a)(1)), each State shall 20 submit the plan required by such section 110(a)(1) 21 for the 2015 ozone standards. 22 (b) CERTAIN PRECONSTRUCTION PERMITS.— 23 VerDate Sep 11 2014 04:33 Mar 18, 2016 Jkt 059200 PO 00000 Frm 00002 Fmt 6652 Sfmt 6201 E:\BILLS\H4775.IH H4775 emcdonald on DSK2VPTVN1PROD with BILLS3 •HR 4775 IH (1) IN GENERAL.—The 2015 ozone standards 1 shall not apply to the review and disposition of a 2 preconstruction permit application if— 3 (A) the Administrator or the State, local, 4 or tribal permitting authority, as applicable, de- 5 termines the application to be complete on or 6 before the date of promulgation of the final des- 7 ignation of the area involved under subsection 8 (a)(2); or 9 (B) the Administrator or the State, local, 10 or tribal permitting authority, as applicable, 11 publishes a public notice of a preliminary deter- 12 mination or draft permit for the application be- 13 fore the date that is 60 days after the date of 14 promulgation of the final designation of the 15 area involved under subsection (a)(2). 16 (2) RULES OF CONSTRUCTION.—Nothing in 17 this section shall be construed to— 18 (A) eliminate the obligation of a 19 preconstruction permit applicant to install best 20 available control technology and lowest achiev- 21 able emission rate technology, as applicable; or 22 (B) limit the authority of a State, local, or 23 tribal permitting authority to impose more 24 stringent emissions requirements pursuant to 25 VerDate Sep 11 2014 04:33 Mar 18, 2016 Jkt 059200 PO 00000 Frm 00003 Fmt 6652 Sfmt 6201 E:\BILLS\H4775.IH H4775 emcdonald on DSK2VPTVN1PROD with BILLS4 •HR 4775 IH State, local, or tribal law than national ambient 1 air quality standards. 2 SEC. 3. FACILITATING STATE IMPLEMENTATION OF NA- 3 TIONAL AMBIENT AIR QUALITY STANDARDS. 4 (a) TIMELINE FOR REVIEW OF NATIONAL AMBIENT 5 AIR QUALITY STANDARDS.— 6 (1) 10-YEAR CYCLE FOR ALL CRITERIA AIR 7 POLLUTANTS.—Paragraphs (1) and (2)(B) of sec- 8 tion 109(d) of the Clean Air Act (42 U.S.C. 9 7409(d)) are amended by striking “five-year inter- 10 vals” each place it appears and inserting “10-year 11 intervals”. 12 (2) CYCLE FOR NEXT REVIEW OF OZONE CRI- 13 TERIA AND STANDARDS.—Notwithstanding section 14 109(d) of the Clean Air Act (42 U.S.C. 7409(d)), 15 the Administrator shall not— 16 (A) complete, before October 26, 2025, any 17 review of the criteria for ozone published under 18 section 108 of such Act (42 U.S.C. 7408) or 19 the national ambient air quality standard for 20 ozone promulgated under section 109 of such 21 Act (42 U.S.C. 7409); or 22 (B) propose, before such date, any revi- 23 sions to such criteria or standard. 24 VerDate Sep 11 2014 04:33 Mar 18, 2016 Jkt 059200 PO 00000 Frm 00004 Fmt 6652 Sfmt 6201 E:\BILLS\H4775.IH H4775 emcdonald on DSK2VPTVN1PROD with BILLS5 •HR 4775 IH (b) CONSIDERATION OF TECHNOLOGICAL FEASI- 1 BILITY.—Section 109(b)(1) of the Clean Air Act (42 2 U.S.C. 7409(b)(1)) is amended by inserting after the first 3 sentence the following: “If the Administrator, in consulta- 4 tion with the independent scientific review committee ap- 5 pointed under subsection (d),

finds that a range of levels of air quality for an air pollutant are requisite to protect public health with an adequate margin of safety, as described in the preceding sentence, the Administrator may consider, as a secondary consideration, likely technological feasibility in establishing and revising the national primary ambient air quality standard for such pollutant.”. (c) **CONSIDERATION OF ADVERSE PUBLIC HEALTH, WELFARE, SOCIAL, ECONOMIC, OR ENERGY EFFECTS.**—Section 109(d)(2) of the Clean Air Act (42 U.S.C. 152409(d)(2)) is amended by adding at the end the following: “(D) Prior to establishing or revising a national ambient air quality standard, the Administrator shall request, and such committee shall provide, advice under subparagraph (C)(iv) regarding any adverse public health, welfare, social, economic, or energy effects which may result from various strategies for attainment and maintenance of such national ambient air quality standard.”. VerDate Sep 11 2014 04:33 Mar 18, 2016 Jkt 059200 PO 00000 Frm 00005 Fmt 6652 Sfmt 6201 E:\BILLS\H4775.IH H4775 emcdonald on DSK2VPTVN1PROD with BILLS6 •HR 4775 IH (d)

TIMELY ISSUANCE OF IMPLEMENTING REGULATIONS AND GUIDANCE.—Section 109 of the Clean Air Act (42 U.S.C. 152409) is amended by adding at the end the following: 4 “(e) **TIMELY ISSUANCE OF IMPLEMENTING REGULATIONS AND GUIDANCE.**—6 “(1) **IN GENERAL.**—In publishing any final rule establishing or revising a national ambient air quality standard, the Administrator shall, as the Administrator determines necessary to assist States, permitting authorities, and permit applicants, concurrently publish regulations and guidance for implementing the standard, including information relating to submission and consideration of a preconstruction permit application under the new or revised standard. 16 “(2) **APPLICABILITY OF STANDARD TO PRECONSTRUCTION PERMITTING.**—If the Administrator fails to publish final regulations and guidance that include information relating to submission and consideration of a preconstruction permit application under a new or revised national ambient air quality standard concurrently with such standard, then such standard shall not apply to the review and disposition of a preconstruction permit application until the 25 VerDate Sep 11 2014 04:33 Mar 18, 2016 Jkt 059200 PO 00000 Frm 00006 Fmt 6652 Sfmt 6201 E:\BILLS\H4775.IH H4775 emcdonald on DSK2VPTVN1PROD with BILLS7 •HR 4775 IH Administrator has published such final regulations and guidance. 2 “(3) **RULES OF CONSTRUCTION.**—3 “(A) Nothing in this subsection shall be construed to preclude the Administrator from issuing regulations and guidance to assist States, permitting authorities, and permit applicants in implementing a national ambient air quality standard subsequent to publishing regulations and guidance for such standard under paragraph (1). 11 “(B) Nothing in this subsection shall be construed to eliminate the obligation of a preconstruction permit applicant to install best available control technology and lowest achievable emission rate technology, as applicable. 16 “(C) Nothing in this subsection shall be construed to limit the authority of a State, local, or tribal permitting authority to impose more stringent emissions requirements pursuant to State, local, or tribal law than national ambient air quality standards. 22 “(4) **DEFINITIONS.**—In this subsection: 23 VerDate Sep 11 2014 04:33 Mar 18, 2016 Jkt 059200 PO 00000 Frm 00007 Fmt 6652 Sfmt 6201 E:\BILLS\H4775.IH H4775 emcdonald on DSK2VPTVN1PROD with BILLS8 •HR 4775 IH “(A) The term ‘best available control technology’ has the meaning given to that term in 2 section 169(3). 3 “(B) The term ‘lowest achievable emission rate’ has the meaning given to that term in section 171(3). 6 “(C) The term ‘preconstruction permit’—7 “(i) means a permit that is required under part C or D for the construction or modification of a major emitting facility or major stationary source; and 11 “(ii) includes any such permit issued by the Environmental Protection Agency or a State, local, or tribal permitting authority.”. 15 (e) **CONTINGENCY MEASURES FOR EXTREME OZONE NONATTAINMENT AREAS.**—Section 172(c)(9) of the Clean Air Act (42 U.S.C. 17502(c)(9)) is amended by adding at the end the following: “Notwithstanding the preceding 19 sentences and any other provision of this Act, such measures shall not be required for any nonattainment area for ozone classified as an Extreme Area.”. 22 (f) **PLAN SUBMISSIONS AND REQUIREMENTS FOR OZONE NONATTAINMENT AREAS.**—Section 182 of the Clean Air Act (42 U.S.C. 17511a) is amended—25 VerDate Sep 11 2014 04:33 Mar 18, 2016 Jkt 059200 PO 00000 Frm 00008 Fmt 6652 Sfmt 6201 E:\BILLS\H4775.IH H4775 emcdonald on DSK2VPTVN1PROD with BILLS9 •HR 4775 IH (1) in subsection (b)(1)(A)(ii)(III), by inserting 1 “and economic feasibility” after “technological achievability”; 3 (2) in subsection (c)(2)(B)(ii), by inserting 4 “and economic feasibility” after “technological achievability”; and 6 (3) in paragraph (5) of subsection (e), by striking 7 “, if the State demonstrates to the satisfaction of the Administrator that—” and all that follows through the end of the paragraph and inserting a 10 period. 11 (g) **PLAN REVISIONS FOR MILESTONES FOR PARTIC-**

12 ULATE MATTER NONATTAINMENT AREAS.—Section 13 189(c)(1) of the Clean Air Act (42 U.S.C. 7513a(c)(1)) 14 is amended by inserting “, which take into account techno- 15 logical achievability and economic feasibility,” before “and 16 which demonstrate reasonable further progress”. 17 (h) EXCEPTIONAL EVENTS.—Section 319(b)(1)(B) 18 of the Clean Air Act (42 U.S.C. 7619(b)(1)(B)) is amend- 19 ed— 20 (1) in clause (i)— 21 (A) by striking “(i) stagnation of air 22 masses or” and inserting “(i)(I) ordinarily oc- 23 curring stagnation of air masses or (II)”; and 24 (B) by inserting “or” after the semicolon; 25 VerDate Sep 11 2014 04:33 Mar 18, 2016 Jkt 059200 PO 00000 Frm 00009 Fmt 6652 Sfmt 6201 E:\BILLS\H4775.IH H4775 emcdonald on DSK2VPTVN1PROD with BILLS10 •HR 4775 IH (2) by striking clause (ii); and 1 (3) by redesignating clause (iii) as clause (ii). 2 (i) REPORT ON EMISSIONS EMANATING FROM OUT- 3 SIDE THE UNITED STATES.—Not later than 24 months 4 after the date of enactment of this Act, the Administrator, 5 in consultation with States, shall submit to the Congress 6 a report on— 7 (1) the extent to which foreign sources of air 8 pollution, including emissions from sources located 9 outside North America, impact— 10 (A) designations of areas (or portions 11 thereof) as nonattainment, attainment, or 12 unclassifiable under section 107(d) of the Clean 13 Air Act (42 U.S.C. 7407(d)); and 14 (B) attainment and maintenance of na- 15 tional ambient air quality standards; 16 (2) the Environmental Protection Agency’s pro- 17 cedures and timelines for disposing of petitions sub- 18 mitted pursuant to section 179B(b) of the Clean Air 19 Act (42 U.S.C. 7509a(b)); 20 (3) the total number of petitions received by the 21 Agency pursuant to such section 179B(b), and for 22 each such petition the date initially submitted and 23 the date of final disposition by the Agency; and 24 VerDate Sep 11 2014 04:33 Mar 18, 2016 Jkt 059200 PO 00000 Frm 00010 Fmt 6652 Sfmt 6201 E:\BILLS\H4775.IH H4775 emcdonald on DSK2VPTVN1PROD with BILLS11 •HR 4775 IH (4) whether the Administrator recommends any 1 statutory changes to facilitate the more efficient re- 2 view and disposition of petitions submitted pursuant 3 to such section 179B(b). 4 SEC. 4. DEFINITIONS. 5 In this Act: 6 (1) ADMINISTRATOR.—The term “Adminis- 7 trator” means the Administrator of the Environ- 8 mental Protection Agency. 9 (2) BEST AVAILABLE CONTROL TECH- 10 NOLOGY.—The term “best available control tech- 11 nology” has the meaning given to that term in sec- 12 tion 169(3) of the Clean Air Act (42 U.S.C. 13 7479(3)). 14 (3) LOWEST ACHIEVABLE EMISSION RATE.— 15 The term “lowest achievable emission rate” has the 16 meaning given to that term in section 171(3) of the 17 Clean Air Act (42 U.S.C. 7501(3)). 18 (4) NATIONAL AMBIENT AIR QUALITY STAND- 19 ARD.—The term “national ambient air quality 20 standard” means a national ambient air quality 21 standard promulgated under section 109 of the 22 Clean Air Act (42 U.S.C. 7409). 23 (5) PRECONSTRUCTION PERMIT.—The term 24 “preconstruction permit”— 25 VerDate Sep 11 2014 04:33 Mar 18, 2016 Jkt 059200 PO 00000 Frm 00011 Fmt 6652 Sfmt 6201 E:\BILLS\H4775.IH H4775 emcdonald on DSK2VPTVN1PROD with BILLS12 •HR 4775 IH (A) means a permit that is required under 1 part C or D of title I of the Clean Air Act (42 2 U.S.C. 7470 et seq.) for the construction or 3 modification of a major emitting facility or 4 major stationary source; and 5 (B) includes any such permit issued by the 6 Environmental Protection Agency or a State, 7 local, or tribal permitting authority. 8 (6) 2015 OZONE STANDARDS.—The term “2015 9 ozone standards” means the national ambient air 10 quality standards for ozone published in the Federal 11 Register on October 26, 2015 (80 Fed. Reg. 65292). 12 Æ VerDate Sep 11 2014 04:33 Mar 18, 2016 Jkt 059200 PO 00000 Frm 00012 Fmt 6652 Sfmt 6301 E:\BILLS\H4775.IH H4775 emcdonald on DSK2VPTVN1PROD with BILLS

Sent: Fri 4/8/2016 1:43:11 AM

Subject: Fwd: Request for Correction of Information on ethanol's lifecycle emissions

REQUEST FOR CORRECTION OF INFORMATION submitted on behalf of THE ENERGY FUTURE COALITION, URBAN AIR INITIATIVE, and GOVERNORS' BIOFUELS COALITION Concerning the U.S. Environmental Protection Agency's LIFECYCLE ANALYSIS OF ETHANOL AND GASOLINE UNDER THE RENEWABLE FUEL STANDARD by C. Boyden Gray Adam R.F. Gustafson Primary Contact James R. Conde BOYDEN GRAY & ASSOCIATES PLLC 801 17th Street NW, Suite 350 Washington, DC 20006 202-955-0620 April 7, 2016 gustafson@boydengrayassociates.com i EXECUTIVE SUMMARY The Energy Future Coalition, Urban Air Initiative, and Governors' Biofuels Coalition (Petitioners) respectfully petition the United States Environmental Protection Agency (EPA) to correct information concerning ethanol's lifecycle emissions of greenhouse gas (GHG) and other pollutants. This information was first published in the Regulatory Impact Analysis (2010 Lifecycle Analysis) accompanying EPA's 2010 Renewable Fuel Standard (RFS) Rule and in EPA's 2011 First Triennial Report to Congress on the environmental impacts of the RFS. EPA continues to use this information in recent RFS rules and other regulatory actions and to publish it on the Agency's website. EPA's information on ethanol's lifecycle emissions is inaccurate and outdated. Contrary to the Agency's 2010 Lifecycle Analysis and its 2011 Report to Congress, the best available science shows that blending ethanol into gasoline has significantly reduced emissions of GHGs and other air pollutants and that displacing gasoline with higher concentrations of ethanol would reduce emissions even further. EPA's continued reliance on erroneous lifecycle estimates will result in damaging legislative and regulatory biofuel policies. And continued dissemination of this misleading information distorts the public's perception of the nation's only viable low-carbon transportation fuel. EPA should correct its 2010 Lifecycle Analysis for future RFS rules, submit a corrected triennial report to Congress (now two years overdue), and cease to rely upon and disseminate its current, erroneous information. EPA's ethanol lifecycle emissions estimates were inaccurate when they were published six years ago, and they have only become more inaccurate in the intervening years as ethanol production has become cleaner and gasoline has become dirtier. GREENHOUSE GAS EMISSIONS New evidence shows that GHG emissions from ethanol are lower than EPA predicted in its 2010 Lifecycle Analysis, and much lower than the lifecycle emissions of gasoline. In particular, new evidence shows that: ii • Increased demand for corn causes much less land-use change and related emissions than EPA predicted in 2010. This evidence includes improved economic models and newly available land-use data from periods of increasing corn ethanol production, which show significant increases in yield but no significant increases in forest conversion. • Improved agricultural practices and technologies are substantially reducing the carbon intensity of ethanol by increasing the ability of soil to capture and retain carbon deep below ground. This evidence includes updated science on soil organic carbon, which indicates that best tillage practices sequester more carbon in the soil than previously thought. In fact, the evidence suggests that many corn fields are net carbon "sinks," capturing more carbon than land-use change and corn farming releases. • More efficient agricultural practices and technologies have also reduced the per bushel amount of nitrogen fertilizer applied to the corn crop and converted into the greenhouse gas nitrous oxide (N_2O). • Biorefineries have become much more efficient, using less natural gas and electricity to produce each gallon of ethanol. Biorefineries are also producing new co-products that reduce the carbon intensity of ethanol. These include distillers' grains, which is used as animal feed; corn oil, which replaces soy-based biodiesel; and other co-products that lower the carbon intensity of corn ethanol. • By contrast, petroleum-based fuels are becoming increasingly carbonintensive. As a result, the gasoline carbon intensity baseline should be significantly higher than EPA suggested, increasing the comparative benefit of ethanol. Considered in light of this new evidence, the lifecycle GHG benefits of the RFS are much greater than EPA predicted. Indeed, blending the volumes of renewable fuel called for by the RFS through 2022 would result in substantial cumulative reductions in carbon emissions—the RFS has already prevented more than 354 million metric tons of GHG pollution, according to a recent conservative estimate, and it will result in even higher savings in the future. EPA should also consider the following information when updating its lifecycle analysis: • Any initial CO_2 emissions associated with the initial implementation of the RFS are now "sunk costs," since corn ethanol has already reached the levels projected by the RFS. Thus, continued ethanol use is substantially less carbon-intensive than EPA suggested in 2010 and offers net GHG savings compared to the gasoline it displaces. iii • Other tailpipe emissions associated with conventional gasoline aromatic hydrocarbons (which ethanol can replace), produce non-GHG "climate forcing agents" such as black carbon that

contribute to climate change, whereas ethanol reduces those emissions. • Ethanol's pollution-reducing benefits could be even greater if it were used to produce higher-octane fuel blends, replacing toxic and carbonintensive fuel additives while allowing carmakers to increase vehicle fuel economy through next-generation engine design. In light of this new evidence, EPA should correct its 2010 Lifecycle Analysis to conform to the best available science. CONVENTIONAL AIR POLLUTANTS Like EPA's GHG analysis, the Agency's 2010 Lifecycle Analysis and the 2011 Report to Congress also contain erroneous estimates of ethanol's effect on emissions of non-GHG (or "conventional") pollutants. In particular, new evidence shows that: • The farming technologies that have increased yields and lowered carbon intensity have also reduced emissions of conventional air pollutants. • Improved control technologies and other innovations have lowered emissions from biorefineries. • U.S. gasoline is increasingly produced from "tight oil," which does more damage to the nation's air quality because it is produced domestically and because it produces higher air toxic emissions during extraction and refining. • The negative health effects of aromatics—the octane additives in gasoline that are displaced by ethanol—are worse than previously estimated, increasing urban particulate matter and other air toxics. The latest fuel effects studies also show that EPA erred in its estimate of tailpipe emissions from E10. In particular, new evidence shows that: • E10 reduces benzene, toluene, ethylbenzene, and xylene emissions. • E10 reduces particulate matter, especially in modern gasoline direct injection engines. • E10 also reduces dangerous polycyclic aromatic hydrocarbons, as well as secondary organic aerosols. • E10 has little or no effect on nitrogen oxides; in modern engines with oxygen sensors, E10 reduces nitrogen oxide emissions. iv • E10 does not increase volatile organic compound emissions. In fact, ethanol reduces these emissions when it is blended into gasoline in higher volumes. In addition to the emissions reductions ethanol has already achieved, transitioning to gasoline blends with a higher ethanol content, such as E30, would significantly reduce lifecycle emissions and improve air quality. * * * A review of the scientific literature confirms that EPA fundamentally erred in the conclusions it reached about the lifecycle emissions of GHGs and other pollutants from ethanol. Despite significant improvements in the relevant technology and a growing body of updated scientific studies, EPA continues to regulate on the basis of its 2010 Lifecycle Analysis, relying on it as recently as last month in a new fuel pathway determination and last year in the 2014–2016 RFS Standards. And EPA continues to publish its outdated 2011 Report to Congress online, having failed to correct its inaccurate information in a follow-up triennial report, as the law requires. Petitioners therefore urge EPA to correct its analysis of the comparative lifecycle pollution effects of ethanol and gasoline in light of the best available science. Continued dissemination of and reliance on erroneous estimates undermines the scientific basis for important policy decisions in the critical area of fuel regulation. v

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EPA conducted a comprehensive lifecycle analysis of corn ethanol and gasoline in support of its RFS program. 1 EPA's 2010 Lifecycle Analysis included GHG and air pollutant emission inventories, future industry projections, and the scientific evidence then available. 2 As EPA noted, the scientific evidence that the Agency relied upon to model lifecycle emissions was subject to many uncertainties, and would change as the science improved. 3 EPA recognized that its lifecycle analysis would need to be updated as newly available science, improved emissions estimates, and new data became available. 4 EPA therefore committed to "further reassess . . . the lifecycle estimates" on an ongoing basis. 5

1 See Renewable Fuel Standard Program, Regulatory Impact Analysis (2010) [hereinafter 2010 RFS RIA]. The Energy Independence and Security Act requires EPA to estimate lifecycle emissions, including emissions from land-use change. See 42 U.S.C. § 7545(o)(1)(H). 2 Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program, 75 Fed. Reg. 14,670, 14,785 (Mar. 26, 2010) [hereinafter 2010 RFS Rule] (representing that the 2010 Lifecycle Analysis included the "most up to date information currently available on the GHG emissions associated with each element of the full lifecycle assessment."). 3 Id. at 14,765 ("EPA recognizes that as the state of scientific knowledge continues to evolve in this area, the lifecycle GHG assessments for a variety of fuel pathways will continue to change."); Id. at 14,786 ("EPA recognizes that the state of scientific knowledge in this area is continuing to evolve, and that as the science evolves, the lifecycle greenhouse gas assessments for a variety of fuel pathways will continue to change."). To illustrate the magnitude of EPA's scientific uncertainty, while EPA estimated a GHG reduction of 21% for corn ethanol, EPA's "95% confidence interval" ranged from a 7% to a 32% reduction. Id. at 14,786. This variance was primarily the result of EPA's uncertainty over GHG emissions from land-use change. Id. 14,765 ("The indirect, international emissions are the component of our analysis with the highest level of uncertainty."). 4 Id. at 14,765 ("EPA recognizes that as the state of scientific knowledge continues to evolve in this area, the lifecycle GHG assessments for a variety of fuel pathways will continue to change."). 5 Id. at 14,765 ("Therefore, while EPA is using its current lifecycle assessments to inform the regulatory determinations for fuel pathways in this final rule, as required by the statute, the Agency is also committing to further reassess these determinations and lifecycle estimates."); Id. at 14,785 ("Therefore, while EPA is making regulatory determinations for fuel pathways as required by the

2 In 2011, as required by statute, 6 EPA published its First Triennial Report to Congress on the environmental impacts of the RFS, as mandated by the Energy Independence and Security Act of 2007 (EISA). 7 The 2011 Report to Congress repeated and elaborated on the 2010 Lifecycle Analysis. 8 Again EPA anticipated "the evolving understanding of biofuel impacts in light of new research results and data"

and promised to revise its analysis, since “[t]his initial report to Congress serves as a starting point for future assessments.” 9 As EPA predicted in 2010, new science now shows that its projections no longer represent “the best available information.” 10 In fact, the scientific evidence shows that EPA’s 2010 Lifecycle Analysis and its 2011 Report to Congress were inaccurate at the time, and their assumptions have been supplanted by significant advances in agricultural production and biorefining, improved modeling, and new data. At every stage, corn ethanol results in less GHG emissions and air toxic pollution than EPA predicted in its 2010 Lifecycle Analysis and 2011 Report to Congress, and significantly less than gasoline. Thus, the best available science demonstrates that blending ethanol into gasoline is lowering GHG emissions

statute in this final rule based on its current assessment, EPA is at the same time committing to further reassess these determinations and the lifecycle estimates.”). 6 Energy Independence and Security Act, Pub. L. 110-140 § 204, 121 Stat. 1492, 1529 (2007) (codified at 42 U.S.C. § 7545 note). 7 U.S. EPA, Biofuels and the Environment: First Triennial Report to Congress, National Center for Environmental Assessment, EPA/600/R-10/183F (2011) [hereinafter 2011 Report to Congress]. 8 See, e.g., id. at 2-3, 3-56, 4-6, 4-11, 4-15, 6-10; see also id. at 1-2 (“[I]t provides complementary information to the GHG impacts described in the [2010 RFS] RIA, which should be consulted for more information on this topic.” (citation omitted)); id. at 2-9. 9 Id. 10 2010 RFS Rule, 75 Fed. Reg. at 14,785. 3 associated with climate change and improving human health. And ethanol’s benefits would be even greater if it were blended at higher levels. But despite this growing body of evidence, and despite EPA’s assurances that it would reassess its initial estimates as the science evolved, six years later EPA continues to rely on its 2010 Lifecycle Analysis to justify new renewable fuel regulations under the RFS. 11 Just this month EPA again relied extensively on its 2010 Lifecycle Analysis to make the latest in a series of threshold “fuel pathway” determinations under the RFS. 12 And the Agency continues to disseminate the 2011 Report to Congress on its website, having failed to correct this information in a new triennial report to Congress, as the law requires. 13

11 See, e.g., Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass Based Diesel Volume for 2017, 80 Fed. Reg. 77420, 7748 (Dec. 14, 2015) [hereinafter RFS Standards for 2014–2016] (“EPA did not quantitatively assess other direct and indirect costs or benefits of increased biofuel volumes such as infrastructure costs, investment, GHG reduction benefits, air quality impacts, or energy security benefits, which all are to some degree affected by the rule. While some of these impacts were analyzed in the 2010 final rulemaking which established the current RFS program, we have not fully analyzed these impacts for the 2014, 2015, and 2016 volume requirements being established today. We have framed the analyses we have performed for this final rule as ‘illustrative’ so as not to give the impression of comprehensive estimates.”); Regulation of Fuels and Fuel Additives: 2013 Renewable Fuel Standards, 78 Fed. Reg. 49,794, 49,814 (Aug. 15, 2013); Regulation of Fuels and Fuel Additives: Additional Qualifying Renewable Fuel Pathways Under the Renewable Fuel Standard Program; Final Rule Approving Renewable Fuel Pathways for Giant Reed (*Arundo Donax*) and Napier Grass (*Pennisetum Purpureum*), 78 Fed. Reg. 41,703, 41,705 (July 11, 2013). 12 See, e.g., Letter from Christopher Grundler, Director, Office of Transportation and Air Quality, U.S. EPA, to Adam Crotteau, Vice President of Engineering, Green Plains Bluffton, LLC (Mar. 16, 2016) (making a threshold GHG pathway determination based on “a straightforward application of the same methodology and much of the same modeling used for the . . . 2010 RFS rule”), available at <http://1.usa.gov/22ZPOHj>. These determinations and accompanying memoranda, which cite the 2010 Lifecycle Analysis extensively, are published on EPA’s website. EPA, Approved Pathways for Renewable Fuel,

<https://www.epa.gov/renewable-fuel-standard-program/approvedpathways-renewable-fuel>. 13 See Energy Independence and Security Act, Pub. L. 110-140 § 204, 121 Stat. 1492, 1529 (2007) (codified at 42 U.S.C. § 7545 note). Congress did not legally require EPA to review GHG lifecycle emissions analyses, but EPA nevertheless restated its 2010 GHG analysis in its 2011 Report to Congress. See 2011 Report to Congress, *supra* note 7, at 2-9. On October 15, 2015, EPA’s Office of Inspector General launched an evaluation project to determine whether EPA had “1) complied with 4 Petitioners therefore respectfully request that EPA correct its 2010 Lifecycle Analysis and 2011 Report to Congress, and subsequent disseminations of this information, to reflect objective, accurate, and useful information on the lifecycle emissions of ethanol and gasoline, as required by the Agency’s Information Quality Guidelines.

14 Part I of this Request for Correction of Information (RFC) identifies Petitioners’ interest in the accuracy of EPA’s information. Part II explains that EPA’s lifecycle analysis is “influential information” subject to the Guidelines’ most stringent standards. Part III summarizes the best available science on the GHG emission effects of corn ethanol and gasoline, and explains why EPA’s 2010 Lifecycle Analysis is

inaccurate. Part IV discusses the best available information on non-GHG “conventional” air pollution, and explains why EPA’s 2010 and 2011 analyses are inaccurate. Parts III and IV begin with “upstream” emissions from feedstock production and fuel refining and move on to “downstream” emissions from fuel evaporation and combustion.

the reporting requirements of laws authorizing the Renewable Fuel Standard (RFS); and 2) updated the lifecycle analysis supporting the RFS with findings from the statutorily mandated National Academy of Sciences 2011 study on biofuels, the EPA’s 2011 Report to Congress on the Environmental Impacts of Biofuels, as well as any subsequent reports or relevant research on lifecycle impacts.” Memorandum from Patrick Gilbride, Director, Science, Research, and Management Integrity Evaluations, Office of Program Evaluation, Office of Inspector General, to Janet McCabe, Acting Assistant Administrator, Office of Air and Radiation (Oct. 15, 2015), available at <http://1.usa.gov/1LSDIRi>. Although the OIG has yet to conclude its investigation, it is clear that EPA has failed to update its lifecycle analysis or to meet its reporting obligations under EISA. 14 See EPA, Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility and Integrity of Information Disseminated by the Environmental Protection Agency (Oct. 2002) [hereinafter Information Quality Guidelines], available at <http://1.usa.gov/1LRLCF7>.

5 I. PETITIONERS’ INTEREST IN EPA’S LIFECYCLE ANALYSIS The Energy Future Coalition is a bipartisan public policy initiative that brings together business, labor, and environmental leaders to address challenges and opportunities in the transition to cleaner energy technologies. The Energy Future Coalition seeks to identify and advance innovative policy options that appeal to a diverse array of competing interests and attract broad political support. Urban Air Initiative is a group of concerned citizens, non-profit groups, agriculture organizations, businesses of all types, and other stakeholders determined to reduce the threat to public health posed by our use of petroleum-based fuels, especially in urban areas where citizens are exposed to mobile source emissions at dangerous levels. The Governors’ Biofuels Coalition is a group of twenty-one state governors who believe that clean-burning biofuels can decrease the nation’s dependence on imported energy resources, improve public health and the environment, and stimulate the national economy. 15 The Governors’ Biofuels Coalition supports activities designed to (i) educate the public and demonstrate the benefits of biofuels; (ii) promote research and market developments to develop biofuel production and use; and (iii) encourage investments in infrastructure to support expansion of the alternative fuels market. EPA’s continuing dissemination of inaccurate information in its 2010 Lifecycle Analysis and its 2011 Report to Congress frustrate Petitioners’ mutual interest in advancing a clean, low-carbon energy future while reducing urban pollution.

15 The members of the Governors’ Biofuels Coalition include the governors of Alabama, Arkansas, Colorado, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Maryland Minnesota, Missouri, Montana, Nebraska, New York, Ohio, Oregon, South Dakota, Tennessee, Washington, and Wisconsin. 6 II. THE AGENCY’S INFORMATION QUALITY GUIDELINES REQUIRE THAT EPA’S 2010 LIFECYCLE ANALYSIS AND EPA’S 2011 REPORT TO CONGRESS MEET HIGH STANDARDS OF OBJECTIVITY AND UTILITY. Pursuant to the Information Quality Act 16 and the implementing guidelines of the Office of Management and Budget, 17 EPA promulgated its own Information Quality Guidelines. 18 Those Guidelines reflect the Agency’s goal that “[d]isseminated information should adhere to a basic standard of quality, including objectivity, utility, and integrity.” 19 For information to be objective, it must be “accurate, reliable, and unbiased,” and it must “be[] presented in an accurate, clear, complete, and unbiased manner.” 20 To meet the “utility” standard, information must be “useful[] . . . to its intended users—here, Congress, the regulated community, and the Agency’s decisionmakers. 21

16 Pub. L. 106-554, § 1(a)(3), 114 Stat. 2763, 2763A-153 (Dec. 21, 2000) (codified at 44 U.S.C. § 3516 note) (requiring OMB to promulgate guidelines that “require that each Federal agency . . . issue guidelines ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by the agency” and “establish administrative mechanisms allowing affected persons to seek and obtain correction of information maintained and disseminated by the agency that does not comply with the [OMB] guidelines.”). 17 Office of Management and Budget, Information Quality Guidelines (Oct. 1, 2002), available at http://www.whitehouse.gov/sites/default/files/omb/infoereg/iqq_oct2002.pdf. 18 Information Quality Guidelines, *supra* note 14. 19 *Id.* at 3. 20 *Id.* at 15. 21 *Id.*; see also Exec. Order No. 13,563, 6 Fed. Reg. 3821, 3821 (Jan. 18, 2011) (noting that when regulating, an agency must use “the best available science” and “the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible.”). 7 A. EPA’s 2010 Lifecycle Analysis and its 2011 Report to Congress Are Information Subject to the Information Quality Guidelines. EPA’s Information Quality Guidelines apply to “information” that is “disseminated” by the Agency. 22 EPA’s 2010 Lifecycle Analysis

and its 2011 Report to Congress qualify as “information,” which is defined to include “any communication or representation of knowledge such as facts or data, in any medium or form.” 23 As the Guidelines acknowledge, such “information” is “essential for assessing environmental and human health risks, designing appropriate and cost-effective policies and response strategies, and measuring environmental improvements.” 24 Both the 2010 Lifecycle Analysis and the 2011 Report to Congress qualify as information “disseminated” by the Agency. 25 The 2010 Lifecycle Analysis is published on EPA’s website, 26 and EPA continues to disseminate its emissions estimates in recent rules published in the Federal Register 27 and on EPA’s public

22 Information Quality Guidelines, *supra* note 14, at 15. 23 *Id.* 24 *Id.* at 5. 25 *Id.* at 15. 26 EPA, Renewable Fuel Standard: Final Rule Additional Resources, <https://www.epa.gov/renewable-fuel-standard-program/renewable-fuel-standard-rfs2-final-ruleadditional-resources>; see also 2010 RFS Rule, 75 Fed. Reg. at 14,670 (“EPA has established a docket for this action under Docket ID No. EPA–HQ–OAR–2005–0161. All documents in the docket are listed in the <http://www.regulations.gov> Web site.”). 27 See, e.g., RFS Standards for 2014–2016, 80 Fed. Reg. at 7748 (“While some of these impacts were analyzed in the 2010 final rulemaking which established the current RFS program, we have not fully analyzed these impacts for the 2014, 2015, and 2016 volume requirements being established today.”). 8 rulemaking docket. 28 Likewise, EPA disseminated the 2011 Report to Congress when the Agency submitted it to Congress for public deliberation, 29 and EPA continues to disseminate the Report on its website. 30 B. EPA’s 2010 Lifecycle Analysis and its 2011 Report to Congress Are “Influential” Information Subject to the Highest Standards of Quality. The Agency’s Information Quality Guidelines adopt a graded approach, in which the applicable standard of quality depends upon the significance of the information in question. EPA’s 2010 Lifecycle Analysis is “influential” information for purposes of the Information Quality Guidelines and thus “should adhere to a rigorous standard of quality.” 31 1. EPA’s analysis of ethanol’s emissions effects is “influential.” First, EPA’s 2010 Lifecycle Analysis is presumptively “influential,” because it was disseminated, and continues to be disseminated, in support of “top Agency action”—namely, rules promulgated by the Agency under the “highly controversial” RFS program. 32 28 See, e.g., Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass-Based Diesel Volume for 2017, <https://www.regulations.gov/documentDetail;D=EPAHQ-OAR-2015-0111-3535>. 29 See 2011 Report to Congress, *supra* note 7, at i. 30 <https://cfpub.epa.gov/ncea/biofuels/recordisplay.cfm?deid=235881>. 31 Information Quality Guidelines, *supra* note 14, at 19–20. 32 *Id.* at 20 (defining “influential” information to include “[i]nformation disseminated in support of top Agency actions (i.e., rules . . .) [and] ‘issues that have the potential to result in major cross-Agency or cross-media policies, are highly controversial, or provide a significant opportunity to advance the Administrator’s priorities.’”); *id.* (defining “Top Agency actions” as actions with “potentially great or widespread impacts on the private sector [or] the public” and “precedent-setting or controversial scientific . . . issues”). 9 Second, EPA’s 2010 Lifecycle Analysis represents a “major work product,” as it was subject to substantial external peer review, public workshops, and expert input by a variety of interest groups. 33 Third, the regulations that EPA continues to base on its 2010 Lifecycle Analysis are “Economically Significant actions,” because they might well determine the fate of the billion dollar renewable fuels industry, 34 as EPA continues to set renewable fuel obligations in the future, including for years beyond 2022. 35 The 2011 Report to Congress qualifies as “influential” on its own terms and because it disseminates the estimates in the 2010 Lifecycle Analysis. 36 As EPA’s official position on the environmental effects of biofuels, the peer-reviewed Report to Congress is used by the nation’s legislators, academics, public agencies, and special interest groups to advance public policy and legislation. Therefore, the Report continues to have “a clear and substantial impact on important public policies and private sector decisions.” 37 33 *Id.*; 2010 RFS Rule, 75 Fed. Reg. at 14,764 (“To ensure the Agency made its decisions for this final rule on the best science available, EPA conducted a formal, independent peer review of key components of the analysis.”). 34 Information Quality Guidelines, *supra* note 14, at 20 (defining “Economically Significant actions” as those “that are likely to have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, Tribal, or local governments or communities” (citing Exec. Order No. 12,866, 3 C.F.R. 638 (1994), reprinted as amended in 5 U.S.C. § 601 app. at 4549 (2006))). 35 In setting renewable fuel standards for calendar years beyond 2022, EISA directs the Administrator of the EPA to consider, among other factors, “the impact of the production and use of renewable fuels on the environment, including on air quality, climate change, conversion of wetlands, ecosystems, wildlife habitat, water quality, and water

supply.” 42 U.S.C. § 7545(o)(2)(B)(ii)(I). Moreover, after 2022 EPA is no longer required to calculate thresholds according to the 2005 petroleum baseline, so EPA should rationally base its regulations on the full lifecycle of gasoline as compared to alternative fuels. 36 2011 Report to Congress, *supra* note 7, at 1-2 (citing 2010 RFS RIA, *supra* note 1). 37 Information Quality Guidelines, *supra* note 14, at 46. 10 2. Because it is influential, EPA’s lifecycle analysis must use the best available science. Because EPA’s estimates of ethanol’s lifecycle emissions are “influential” information, they are “subject to a higher degree of quality . . . than information that may not have a clear and substantial impact on important public policies or private sector decisions.” 38 For influential air pollutant emissions estimates that involve “human health, safety or environmental risk assessments,” the Information Quality Guidelines provide that “EPA will ensure, to the extent practicable and consistent with Agency statutes and existing legislative regulations, the objectivity of such information disseminated by the Agency by applying the following . . . principles . . . : (A) The substance of the information is accurate, reliable and unbiased. This involves the use of: (i) the best available science and supporting studies conducted in accordance with sound and objective scientific practices, including, when available, peer reviewed science and supporting studies; and (ii) data collected by accepted methods or best available methods (if the reliability of the method and the nature of the decision justifies the use of the data). 39 Although the “best available science” standard “usually refers to the availability at the time an assessment is made,” 40 that general rule does not apply when EPA continues to re-disseminate and rely on its emissions estimates in

38 *Id.* 39 *Id.* at 22. Influential risk assessments must also be presented in a form that is “comprehensive, informative, and understandable.” *Id.* 40 *Id.* at 23. 11 promulgating new major rules. 41 Moreover, the Information Quality Guidelines “recognize[] that scientific information about risk is rapidly changing and that risk information may need to be updated over time,” especially when required by “statutes” (like EISA) and when “the updated risk assessment will have a clear and substantial impact on important public policies or private sector decisions.” 42 In this case, EPA has already determined that its emissions estimates “need to be updated over time.” 43 The Agency said so explicitly when it initially disseminated the 2010 Lifecycle Analysis and 2011 Report to Congress. 44 For the reasons that follow, EPA’s lifecycle estimates do not satisfy even the basic requirements of objectivity, utility, and integrity applicable to all EPA-disseminated information—much less the heightened standards of information quality for influential risk assessments.

41 Under Executive Orders 13,563 and 12,866, the Agency must provide the public with an up-to-date and accurate analysis of the consequences of economically significant regulatory actions. See Exec. Order No. 13,563, 76 Fed. Reg. 3821 (Jan. 18, 2011); Exec. Order No. 12,866, 3 C.F.R. 638 (1994), reprinted as amended in 5 U.S.C. § 601 app. at 45-49 (2006). Executive Order 13,563 specifically requires the Agency to use “the best available science” and “the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible.” Exec. Order No. 13,563, 6 Fed. Reg. at 3821. 42 Information Quality Guidelines, *supra* note 14, at 23; see *supra* pp. 8–9 (explaining that EPA’s lifecycle analysis affects biofuel policy and investment). 43 Information Quality Guidelines, *supra* note 14, at 23. 44 See 2010 RFS RIA, 45 Fed. Reg. at 14,765 (“EPA recognizes that as the state of scientific knowledge continues to evolve in this area, the lifecycle GHG assessments for a variety of fuel pathways will continue to change.”); *id.* at 14,785 (“EPA is at the same time committing to further reassess these determinations and the lifecycle estimates.”); 2011 Report to Congress, *supra* note 7, at ix (“This initial report to Congress serves as a starting point for future assessments.”). 12 C. EPA’s 2010 Lifecycle Analysis and 2011 Report to Congress Do Not Meet the “Objectivity” or “Utility” Standards Under the Guidelines. To meet EPA’s “objectivity” standard, the Agency’s information must be “accurate, reliable, and unbiased.” 45 But as Petitioners demonstrate in Parts III and IV of this RFC, EPA’s 2010 Lifecycle Analysis and its 2011 Report to Congress are not accurate or reliable sources of information. EPA continues to disseminate and rely on this information even though it was based on erroneous assumptions and does not account for significant improvements in modeling and more reliable data that have since become available. The 2010 Lifecycle Analysis and the 2011 Report to Congress also do not meet the “utility” standard under the Guidelines—the information must be “useful for its intended users.” 46 Here, the primary intended users of the 2010 Lifecycle Analysis are EPA officials, who have an obligation to assess the costs and benefits of new regulations on the basis of the best available science. Because the information is inaccurate and outdated, the 2010 Lifecycle Analysis is no longer a useful tool to predict the consequences of the Agency’s decisions. The primary intended user of the 2011 Report to Congress is Congress itself. Because EPA’s information is outdated, and EPA’s next report is overdue, the 2011 Report to Congress is no longer useful to make legislative policy decisions, the particular province of Congress. 47

45 Information Quality Guidelines, *supra* note 14, at 15. 46 *Id.* 47 U.S. Const. art. I., § 1 (“All legislative powers herein granted shall be vested in a Congress of the United States, which shall consist of a Senate and a House of Representatives.”). 13 III. GREENHOUSE GAS EMISSIONS In its 2010 Lifecycle Analysis, EPA concluded that by 2022, corn ethanol would achieve on average lifecycle greenhouse gas (GHG) emissions savings of only 21% compared to EPA’s 2005 gasoline carbon intensity baseline of 93.01 grams of carbon dioxide equivalent per megajoule (g CO₂ e/MJ). 48 Reviewing EPA’s own data, a 2011 National Academy of Sciences Report on the RFS (NAS Report) cautioned that the RFS “might not achieve the intended GHG reductions” on a cumulative, as opposed to annualized, basis. 49 While EPA’s findings were doubtful in 2010, they are now doubly so, given the wealth of newly available scientific and economic data that undermines EPA’s 2010 Lifecycle Analysis. For example, EPA’s estimates of GHG emissions are flatly inconsistent with the subsequent findings of experts at the Department of Energy. As early as 2012, Argonne National Laboratory’s (Argonne) Energy Division, which develops the annual Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model for comparing lifecycle GHG emissions, 50 estimated a much lower 48 2010 RFS Rule, 75 Fed. Reg. at 14,786 (“The results for this corn ethanol scenario are that the midpoint of the range of results is a 21% reduction in GHG emissions compared to the gasoline 2005 baseline. The 95% confidence interval around that midpoint ranges from a 7% reduction to a 32% reduction compared to the gasoline baseline.”). EPA reported its carbon intensity baseline for 2005 gasoline as 98.205g CO₂ e/mmBTU, which is equivalent to 93.01g CO₂ e/MJ. 2010 RFS RIA, *supra* note 1, at 467. 49 National Research Council, National Academy of Sciences, Renewable Fuel Standard: Potential Economic and Environmental Effects of U.S. Biofuel Policy 201 (2011) [hereinafter NAS Report]. 50 Argonne has devoted nearly two decades of expertise to researching lifecycle emissions, refining its GREET model every year to reflect improvements in accounting, newly available data, and peer reviewed science. See Michael Q. Wang et al., Development and Use of the GREET Model to Estimate Fuel Cycle Energy Use and Emissions of Various Transportation Technologies and Fuels, DOE Argonne Nat’l Lab.; ARGONNE/ESD-31 (1996). The model is extremely influential and used by a 14 carbon intensity figure, taking into account land-use effects. Argonne estimated that GHG lifecycle emissions from corn ethanol were 19% to 48% lower than those of gasoline in 2012, even when including land-use change. 51 This compares favorably with EPA’s 2010 Lifecycle Analysis estimate of a 7% to 32% reduction in GHG emissions in 2022, 52 and even more favorably with the 2010 Lifecycle Analysis of GHG emissions effects for 2012, which erroneously indicated that the RFS would increase emissions during its initial implementation. 53 Thus, only two years later, the foremost experts in lifecycle analysis estimated GHG reductions from ethanol an order of magnitude greater than those estimated by the Agency’s 2010 Lifecycle Analysis. And unlike the lifecycle GHG emissions of petroleum-based gasoline, which have been trending higher, the lifecycle emissions of ethanol are trending lower. A 2014 study by the National Renewable Energy Laboratory (NREL) notes that because of “green” innovation in the agriculture and biofuels industry, “the production and use of corn ethanol emitted 44% fewer GHG emissions, consumed 54% less fossil energy and required 44% less land in 2010 compared to 1990 on a life cycle basis.” 54 These dynamic improvements in the ethanol industry highlight the variety of regulatory agencies, including EPA. See *Rocky Mountain Farmers Union v. Corey*, 730 F.3d 1070, 1081–82 (9th Cir. 2013) (explaining the GREET model). 51 Michael Q. Wang et al., Well-to-Wheels Energy Use and Greenhouse Gas Emissions of Ethanol from Corn, Sugarcane, Corn Stover, Switchgrass, and Miscanthus, 7 *Environ. Res. Lett.*, at 9 (2012). Argonne found that ethanol made from sugarcane, corn stover, switchgrass and miscanthus could reduce lifecycle GHGs even further—40–62%, 90–103%, 77–97%, and 101–115%, respectively. *Id.* 52 2010 RFS Rule, 75 Fed. Reg. at 14,786. EPA’s central estimate of corn ethanol’s carbon intensity in 2022 was 79 kg CO₂ e/mmBTU, equivalent to 74.82g CO₂ e/MJ. *Id.* at 14,788. 53 NAS Report, *supra* note 49, 201 (collecting EPA data from the 2010 RFS RIA showing initial positive emission values for the year 2012). 54 Helena L. Chum et al., Understanding The Evolution Of Environmental and Energy Performance of the U.S. Corn Ethanol Industry: Evaluation of Selected Metrics, 8 *Biofuels, Bioproducts, & Biorefining* 224 (March/April 2014). 15 importance of considering the most recent, updated evidence, as well as predicted industry trends, on an ongoing basis. As described below, at every stage of their respective lifecycles—i.e., corn agriculture and petroleum extraction, fuel refining, and finally, combustion in vehicle engines—the evidence shows that the carbon intensity of corn ethanol is trending lower than that of petroleum-based fuels. Section A will address land-use change. Sections B, C and D will address the other “upstream” emissions from corn agriculture and biorefinery operations compared to the corresponding stages of gasoline production.

Section E will discuss “downstream” emissions at the tailpipe. In short, the best available science shows that the information presented in EPA’s 2010 Lifecycle Analysis and 2011 Report to Congress are inaccurate. Corn ethanol is much less carbon-intensive than gasoline. One study puts the carbon impact of corn ethanol at 59.21g CO₂ e/MJ, compared to 96.89g for gasoline. 55 As explained below, that represents a conservative estimate, as it does not incorporate new estimates of soil organic carbon sequestration—the amount of carbon stored in the soil by biomass. A. Land-Use Change New evidence has exposed significant flaws in EPA’s estimate of land-use change GHG emissions. Updated science on soil sequestration and empirical evidence of actual land-use patterns demonstrate that carbon emissions from landuse change are much lower than the estimate EPA continues to rely on and disseminate to the public.

55 Susan Boland & Stefan Unnasch, Life Cycle Associates, GHG Emissions Reductions Due to RFS, LCA.6075.11.2015, at 9 (2015). 16 This section summarizes the “first-generation” land-use change science and explains how new data and modeling undermine EPA’s 2010 Lifecycle Analysis, which inaccurately suggests that the RFS has increased GHG emissions. 56 That is not right. Current science suggests that the impact from land-use change due to ethanol production is negligible. 1. First-Generation Land-Use Studies The interest in land-use change as a distinct topic in biofuel lifecycle analysis was sparked by a 2008 study by a team of scientists led by Timothy Searchinger. 57 Searchinger conjectured that an increased demand for corn would raise prices, which would in turn incentivize the conversion of forests and grassland to crop agriculture in the United States and elsewhere, releasing naturally stored CO₂ through land conversion. 58 Using FAPRI-CARD—the same model that EPA used to estimate international land-use change GHG emissions 59 —Searchinger predicted that the carbon intensity value for land-use change induced by biofuels was a whopping 104g CO₂ e/MJ 60 —more than the entire lifecycle carbon intensity of baseline gasoline. 61 If true, this would mean that on a lifecycle basis corn ethanol has nearly double the GHG emissions of gasoline. 62

56 NAS Report, supra note 49, at 202. 57 Timothy Searchinger et al., Use of U.S. Croplands for Biofuels Increases Greenhouse Gases Through Emissions from Land-Use Change, 319 Science 1238 (2008). 58 Id.. 59 2010 RFS Rule, 75 Fed. Reg. at 14,768; 2010 RFS RIA, supra note 1, at 302. 60 Searchinger, supra note 57, at 1239. 61 EPA’s baseline gasoline carbon intensity for the year 2005 was 98.205g CO₂ e/mmBTU (or 93.01g CO₂ e/MJ). 2010 RFS RIA, supra note 1, at 467.. 62 Searchinger estimated ethanol’s total lifecycle GHG emissions to be 93% greater than gasoline’s. Searchinger, supra note 57, at 1239. 17 Only two years later, even while land-use change science was rapidly improving in response to Searchinger’s controversial study, EPA’s 2010 Lifecycle Analysis estimated overall corn-ethanol land-use change emissions in 2022 at 30kg CO₂ e/mmBtu, equivalent to 28.5g CO₂ e/MJ. 63 The estimates reported in these early analyses were never accurate, and they are not supported by the best available science. Parameters related to yield improvement, land displacement, and the type of land converted are key drivers of modeled GHG emissions from land-use change, 64 but early analyses of land-use change—including EPA’s own analyses—failed to accurately reflect these complexities. For example, EPA did not account for many of the fallow or marginal agricultural lands that could be converted to grow corn, or the potential for growing multiple harvests on a single piece of land (“double cropping”). Later models of indirect land-use change have included “a more detailed assessment of yield improvement, land cover type, soil carbon stocks, and other parameters,” resulting in significantly lower estimates of land-use change emissions. 65 Most importantly, empirical data has discredited early model assumptions on forest conversion: Contrary to EPA’s predictions, ethanol has not increased the global rate of deforestation. 66 For this and other reasons, over the years the scientific

63 2010 RFS Rule, 75 Fed. Reg. at 14,788; see also NAS Report, supra note 49, at 193–194. 64 NAS Report, supra note 49, at 191. For an early criticism of Searchinger, see Michael Q. Wang & Zia Haq, Response to February 7, 2008 Scienceexpress Article, available at <http://bit.ly/1phwhEa>. 65 Boland & Unnasch, supra note 55, at 20. 66 Id. at 19; see also 2010 RFS RIA, supra note 1, at 351 (“For instance, in 2022, as demand for corn ethanol increases in the corn ethanol scenario . . . total cropland pasture decreases by 0.9 million acres . . . [and] forestland decreases by 0.03 million acres.”). 18 community has rejected EPA’s estimate for land-use change emissions from corn ethanol as unrealistically high as compared with real-world data. 67 For example, an influential land-use change model developed by a network of economists associated with the Global Trade Analysis Project (GTAP) at Purdue, has consistently estimated lower emissions from land-use change than EPA. An initial study led by Professor Thomas Hertel in 2010 estimated a carbon intensity value of 27g CO₂ e/MJ for corn ethanol with an upper bound of 90g and a lower bound of 14.7g, assuming an increase of 13.2 billion gallons of ethanol. 68 A subsequent GTAP/Purdue study in 2010

used the same data but refined the GTAP model to include more realistic assumptions about land types, land conversion rates, and the response of crop yields to prices. 69 Applying these assumptions, Purdue projected a carbon intensity value of 14g CO₂ e/MJ for land-use change in 2022 due to corn-ethanol expansion under the RFS, a fraction of EPA's annualized estimate 67

2010 RFS Rule, 75 Fed. Reg. at 14,785–86. Although the actual results of these studies may not always be readily compared (given the different target years and production volumes modeled), the key point is that refined models predict lower carbon intensity values for land-use change than those predicted by EPA. 68 Thomas W. Hertel et al., *Effects of U.S. Maize Ethanol on Global Land-use and Greenhouse Gas Emissions: Estimating Market-Mediated Responses*, 60 *BioScience* 223 (2010). EPA's own land-use change assessment primarily relied on outdated economic models developed by the Food and Agricultural Policy and Research Institute, as maintained by the Center for Agricultural and Rural Development (FAPRI-CARD) and the Forestry and Agricultural Sector Optimization Model (FASOM) developed by Texas A&M. The agency used FAPRI-CARD to model international land-use emissions, and FASOM to model domestic emissions. 2010 RFS Rule, 75 Fed. Reg. at 14,768. EPA also "opted to use the GTAP model to inform the range of potential GHG emissions associated with land use change resulting from an increase in renewable fuels." *Id.* at 14,781. All of these models have now been updated, but EPA has not revised its previous estimates to reflect model updates. 69 The study estimated that every thousand gallons of ethanol produced would require an increase of 0.32 acres of cropland, with 24% of the associated land-use change occurring in the United States. Of these 0.32 acres, Tyner estimated that 33% of the added cropland would be converted forest, and 67% would be converted grassland. For an explanation of the refinements, see Wallace E. Tyner et al., *Land-use Changes and Consequent CO₂ Emissions due to US Corn Ethanol Production: A Comprehensive Analysis: Final Report* (April, 2010), available at <http://1.usa.gov/1Tt8Y6v>. 19 for 2022. Purdue's estimate might seem low by comparison, but it is in fact much higher than current, updated estimates. 70 To be sure, when EPA conducted its 2010 Lifecycle Analysis, the science of land-use change was in its infancy—there remained substantial uncertainty in models of soil organic carbon and in economic models of global land-use change. 71 Reviewing EPA's 2010 Lifecycle Analysis and other lifecycle studies that included land-use change, the NAS Report concluded that "additional data are needed." 72 "In coming years," the NAS Report predicted, "scientists will undoubtedly continue to refine their models to improve estimates of GHG emissions from land-use changes." 73 After several years of biofuels policy, this "additional data" is now readily available. Updated economic models of land-use change uniformly predict lower lifecycle emissions. There is no reason for EPA to continue disseminating and relying on its erroneous estimates.

2. Second-Generation Land-Use Studies Since EPA's 2010 Lifecycle Analysis, more accurate lifecycle emission models have shown that initial estimates of emissions from first-generation land-use 70 See *infra* pp. 19–25. 71 See NAS Report, *supra* note 49, at 5, 245. 72 NAS Report, *supra* note 49, at 190. In its 2010 RFS Rule, EPA committed itself to seek further input from the NAS Report and other experts on its lifecycle analysis. 2010 RFS Rule, 75 Fed. Reg. at 14,785 ("As part of the ongoing effort, we will ask for the expert advice of the National Academy of Sciences as well as other experts and then reflect this advice and any updated information in a new assessment of the lifecycle GHG emission performance of the biofuels being evaluated today. EPA will request that the National Academy of Sciences evaluate the approach taken in this rule, and the underlying science of lifecycle assessment and in particular indirect land use change, and make recommendations for subsequent rulemakings on this subject."). 73 *Id.* at 192. 20 studies were too high. 74 As one recent study explained, "prior to the last couple of years, there was insufficient data on global land-use change during the biofuels boom era. However, now we have that data, and it can be used to better calibrate prior estimates of land-use change." 75 Accordingly, economists have recalibrated their models. 76 Argonne's most recent peer-reviewed estimate for the carbon intensity of land-use change is 7.6g CO₂ e/MJ for corn ethanol. 77 However, Argonne scientists have opined that, in light of GTAP model refinements, a more realistic estimate is 3.2g CO₂ e/MJ. 78 As explained below, 79 even this estimate is too high, because it is based on the inaccurate assumption that all corn ethanol is grown with conventional tilling practices. 80 a. Argonne's 2013 Estimate for Land-Use Change GREET's updated carbon intensity value for land-use change is based upon an influential peer-reviewed study led by Argonne's Jennifer Dunn, published in 2013. 81 The study predicts significantly lower lifecycle CO₂ emissions than most

74 See, e.g., Jennifer B. Dunn et al., *Land-use change and greenhouse gas emissions from corn and cellulosic ethanol*, 6 *Biotech. for Biofuels* 51 (2013). 75 See, e.g., Farzad Taheripour & Wallace E. Tyner, *Biofuels and Land-use Change: Applying Recent Evidence to Model Estimates*, 3 *Appl. Sci.* 14, 15

(2013). 76 See, e.g., Holly Gibbs et al., *New Estimates of Soil and Biomass Carbon Stocks for Global Economic Models*, Global Trade Analysis Project (GTAP) Tech. Paper No. 33 (2014), available at <http://bit.ly/1TuJq98>. 77 Boland & Unnasch, *supra* note 55, at 6. 78 See Jennifer B. Dunn et al., DOE Argonne Nat'l Lab., *Carbon Calculator for Land Use Change from Biofuels Production*, ANL/ESD/12-5, at 21, available at <http://1.usa.gov/1M84WIT>. 79 See *infra* pp. 25–28. 80 Dunn et al., *supra* note 78, at 21. 81 Dunn et al., *supra* note 74. 21 previous estimates, mostly as a result of refined modeling of soil organic carbon and refinements in the GTAP model. 82 Soil organic carbon and the carbon sequestration rate of biomass are crucial parameters in land-use change models; together, these factors determine: (1) how much carbon is stored in an ecosystem before a “disturbance” (like conversion to cropland) releases some of the carbon; (2) how much carbon is released by a given disturbance; and (3) how much (and how fast) carbon is stored again in the soil over the years. 83 Previous land-use change model assumptions of soil organic carbon and carbon sequestration, however, had been based on unrepresentative soil samples. 84 Argonne addressed these shortcomings. Using the GTAP land-use change model in combination with refined soil organic carbon models, 85 Argonne estimated that corn ethanol land-use changes contributed a carbon intensity of 7.6g CO₂e/MJ to ethanol’s lifecycle GHG emissions—with a possible range of 4.7g to 11g. Another recent Argonne study on soil organic carbon points out an additional flaw in the first-generation land-use change models. These models relied on soil 82 *Id.* at 3. The updated GREET model’s assumptions are explained in detail in previous Argonne publications. See Ho-Young Kwon et al., *Modeling State-Level Soil Carbon Emission Factors Under Various Scenarios for Direct Land-use Change Associated with United States Biofuel Feedstock Production*, 55 *Biomass & Bioenergy*, 299–310 (2013). Argonne studies used the CENTURY model, which has been validated for use in analyzing different land types, at different soil levels. For a summary of Century, see Zhangcai Qin et al., DOE Argonne Nat'l Lab., *Incorporating Agricultural Management Practices into the Assessment of Soil Carbon Change and Life-Cycle Greenhouse Gas Emissions of Corn Stover Ethanol Production*, ARGONNE/ESD-15/26 (2015). 83 Dunn et al., *supra* note 74, at 5–6. This process may be roughly analogized to a loan; the initial disturbance is a “debt” which must be “paid back” over a limited period; the “foregone” carbon sequestration determines the amount of “interest” that must be paid on the “debt,” and biomass sequestration “pays back” the debt, as the soil returns to a carbon equilibrium. *Id.* 84 *Id.* at 2. 85 Dunn, *supra* note 74, at 2. 22 carbon data from unjustifiably shallow soil samples; deeper soil samples reveal higher sequestration rates for corn and other biofuel crops, because the roots of the corn plant store carbon deep in the soil. 86 Moreover, past models failed to properly account for the rate at which new cropland can restore carbon released by its initial conversion. Previous models assumed uniform sequestration rates over the years, and tended to measure land-use change according to arbitrary time frames (for example, 30 years). 87 b. GTAP’s Model Update Argonne’s 2013 estimate for land-use change was too high because it relied on an old version of GTAP to model the economics of land-use change. Both GTAP economists and Argonne scientists have now acknowledged that the old GTAP model was inaccurate. The new GTAP model predicts lower land area changes, particularly in high-carbon forests. As a result, land-use change emissions estimates relying on GTAP have to be lower. As GTAP economists have explained, the costs of converting existing pasture or forests to cropland are not the same; generally it is less expensive to convert pasture. 88 And it is even less expensive to simply switch crops on existing cropland. This difference in cost is influenced by regulatory barriers. For example, the RFS excludes from its definition of “renewable fuel” any fuel produced from crops grown on land that was not actively managed or fallow before enactment of the Energy 86 Zhangcai Qin et al., *Soil Carbon Sequestration and Land-use Change Associated With Biofuel Production: Empirical Evidence*, GCB *Bioenergy* (2015), available at <http://bit.ly/1USWULe>. EPA believed its own choice of 30 year time frame was reasonable. 2010 RFS Rule, 75 Fed. Reg. at 14,780. 87 Qin et al., *supra* note at 86, at 2. The NAS Report noted this problem as well. See NAS Report, *supra* note 49, at 197. EPA believed its own choice of a 30 year time frame was reasonable. 2010 RFS Rule, 75 Fed. Reg. at 14,780. 88 Taheripour & Tyner, *supra* note 75, at 16. 23 Independence and Security Act of 2007. 89 Federal regulations in turn place onerous record-keeping requirements on biofuel producers, requiring them to prove that their biomass is not derived from converted forests. 90 Despite these regulatory and economic barriers, previous land-use models assumed it would cost the same to convert forest or pasture into croplands. 91 Recognizing this significant flaw, Purdue has updated the GTAP model to factor in the higher costs of converting forests into cropland in most countries. 92 Purdue has also updated GTAP to reflect the declining historical rates of conversion from forest to cropland. 93 As a result of these changes, the GTAP model now projects “less expansion in global cropland due to ethanol

expansion”; a “lower U.S. share in global cropland expansion”; and a “lower forest share in global cropland expansions.” 94 According to Argonne, this new version of GTAP reduces corn ethanol “land-use change GHG emissions by 3g CO₂ e/MJ,” resulting in an overall land-use change carbon impact estimate of 3.2g CO₂ e/MJ, assuming conventional tilling practices. 95 When

89 Pub. L. No. 109-58, § 201(l)(i), 121 Stat. 1492. 90 Jody M. Endres, *Barking up the Wrong Tree? Forest Sustainability and Emerging Bioenergy Policies*, 37 Vt. L. Rev. 1, 9 (2013). 91 Taheripour & Tyner, *supra* note 75, at 16. 92 *Id.* at 27 (“In the real world often it is not as easy or inexpensive to convert forest to cropland as pasture. For example, farmers frequently switch back and forth from pasture and grassland to crop production and vice versa in the Northern Plains regions of the USA (including parts of Iowa, Minnesota, North Dakota, South Dakota and Montana) where converting grasslands to crop production and vice versa is not costly. However, transforming managed forests to cropland is not a common practice.”). 93 Purdue uses FAOSTAT harvested land data, which does not account for double or triple cropping, but Purdue attempts to correct for this bias. *Id.* at 19. 94 *Id.* 95 See Jennifer B. Dunn et al., DOE Argonne Nat’l Lab., *Carbon Calculator for Land Use Change from Biofuels Production*, ANL/ESD/12-5, at 21, <http://1.usa.gov/1R8tummy>. Indeed, 24 accounting for reduced tillage or no-till farming, Argonne further reduces the landuse change emissions of corn ethanol to 2.89g and 2.15g CO₂ e/MJ, respectively. 96 EPA’s 2010 Lifecycle Analysis does not reflect this improved modeling. c. New Land-Use Data New empirical data on land-use change shows that previous models substantially overestimated land-use change, by orders of magnitude. When realworld data does not fit the model, the model is wrong. Despite increases in commodity prices and a 10-billion-gallon increase in domestic ethanol production, recent USDA data for the United States illustrates “that while corn acreage has increased in parallel with the build-up of the corn ethanol industry between 2004 and 2013, total principal crop acreage has remained fairly constant and constituted 311 million acres in 2013.” 97 Corn grown as biomass has largely replaced other croplands, not forests or grasslands. Contrary to original predictions, there has been no significant increase in U.S. cropland acreage despite commodity price increases. 98 As Bruce Babcock and Zabid Iqbal have shown in a recent empirical study of land-use change, increases in food crop production across the globe have been driven by crop “intensification”—increased yields per acre and double or triple cropping—domestic land-use emissions are negative, as a result of increased sequestration (–1.9g CO₂ e/MJ). Only international land-use emissions are positive, at about 5.1g, summing up to 3.2g. *Id.* 96 See GREET1_2015 (summarized in Appendix I, *infra* p. 69). 97 Michael Wang & Jennifer B. Dunn, *Comments on Avoiding Bioenergy for Food Crops and Land* by Searchinger and Heimlich, at 2 (February 6, 2015), available at <http://1.usa.gov/1RB1E2F>. 98 Indeed, transitions from other crops to corn may actually be reducing atmospheric carbon, because, depending on the geographic region, as well as soil and yield conditions, corn soils may sequester comparatively more carbon than other crops. As Argonne found in a recent analysis, soil organic carbon “increased 15–23%” in general crop to corn transitions. Qin et al., *supra* note 86, at 2. 25 not extensive conversions to croplands. 99 Past models used to estimate land-use changes, like the FAPRI-CARD model EPA used in its 2010 Lifecycle Analysis, 100 relied on historical harvest data that did not take into account the “non-yield” intensification of cropland, through techniques like double cropping. 101 Thus, EPA overstated the carbon intensity of corn ethanol. And even when new acres have been devoted to corn, “the type of land converted to accommodate biofuels was not forest or pastureland but rather cropland that did not go out of production.” 102 In sum, the erroneous assumptions embedded in EPA’s land-use change models overstated the extent of land-use change and its effect on GHG emissions. 103 B. Corn Agriculture 1. Soil Organic Carbon a. Agricultural Management Practices Since EPA’s 2010 Lifecycle Analysis, new evidence shows that improved agricultural practices have substantially increased soil carbon sequestration, reducing the carbon intensity of ethanol. In fact, recent soil analyses suggest that corn soils in 99 Bruce A. Babcock & Zabid Iqbal, *Using Recent Land-use Changes to Validate Land-use Models*, 14-SR 109, at 31 (2014). Global data shows that there has been a very minor increase in cropland acreage when compared to global crop intensification. The authors estimated that the intensive response—the increase in acreage productivity—has been 15 times larger than the increase in acreage. *Id.* at 17. 100 2010 RFS Rule, 75 Fed. Reg. at 14,768; 2010 RFS RIA, *supra* note 1, at 302. 101 Babcock & Iqbal, *supra* note 99, at 30 (concluding that “existing estimates of greenhouse gas emissions caused by land conversions due to biofuel production are too high because they are based on models that do not allow for increases in non-yield intensification of land-use.”). 102 *Id.* at 26. 103 *Id.* 26 certain areas of the Corn Belt are a net carbon “sink,” sequestering more carbon than the amount of CO₂ release during the production of corn. As mentioned above, soil sequestration is an

important factor in estimating the lifecycle emissions of corn ethanol. Growing plants decreases atmospheric carbon by sequestering carbon into the soil, which results in a carbon “credit” in a proper lifecycle analysis. 104 Moreover, corn is part of small subset of “C 4 plants”—named after the 4-carbon molecule present in these plants—which photosynthesize CO₂ more efficiently than “C 3 plants” do. 105 Crop yields also have an effect on carbon sequestration: Higher yields generally correlate with increased amounts of carbon stored in the soil, because above-ground biomass is roughly equal to below ground biomass. Thus, when corn, a crop that yields 10.5 tons per hectare, displaces soybeans with a yield of 3 tons per hectare, significantly more carbon is sequestered. 106 The actual effect of agricultural management practices on soil organic carbon has, until recently, been underestimated. For example, reviewing the studies available as of 2011, the NAS Report suggested that the effect of no-till and reduced tillage practices on soil organic carbon sequestration rates “is inconsistent and depends on the depth of soil sampling and crop management.” 107 According to the NAS Report, studies that assessed the carbon content of the entire soil profile (0–60cm) “did not find higher soil carbon in no-till 104 See, e.g., Qin et al., *supra* note 82. 105 See generally, Colin P. Osborne & David J. Beerling, *Nature’s Green Revolution: The Remarkable Evolutionary Rise of C4 Plants*, *Philosophical Transactions of the Royal Soc’y B* 173, 173 (2006). 106 See A.J. Lorenz et al., *Breeding Maize for a Bioeconomy: A Literature Survey Examining Harvest Index and Stover Yields and their Relationship to Grain Yield*, 50 *Crop Sci.* 1 (2010). 107 NAS Report, *supra* note 49, at 186. 27 fields than in conventionally tilled fields.” 108 Perhaps for this reason, EPA’s 2010 Lifecycle Analysis only included soil carbon for the top 30cm of soil, and did not include no-till or reduced-tillage estimates. 109 New evidence, however, shows that agricultural management practices like no-till have a substantial effect on soil organic carbon. A subsequent multiyear study of South Dakota soil samples, led by soil scientist David Clay, found clear evidence that no-tillage practices (and higher corn yields) increase carbon sequestration. The study used laboratory surface soil samples submitted by agricultural producers, 110 recording information on their agricultural practices, fertilizer use, and expected yield associated with the samples. The study also used benchmark soil samples to estimate the change in soil carbon sequestration associated with improved agricultural practices (higher yields, and no-till farming). From the laboratory results, Clay concluded that many of the cropland soils studied were now net “carbon sinks,” thanks, in part, to the adoption of reduced tillage and no-tillage practices, as well as increased crop yields over the years. 111 Clay found that surface soil carbon sequestration reduces the carbon intensity of corn ethanol by as much 19.6g CO₂ e/MJ in the North-Central and Southeast regions of North Dakota. 112 108 *Id.* 109 2010 RFS RIA, *supra* note 1, at 396, 415. 110 See David E. Clay et al., *Corn Yields and No-Tillage Affects Carbon Sequestration and Carbon Footprints*, 104 *Agron. J.* 763 (2012) [hereinafter Clay et al., *Carbon Sequestration*]; see also David Clay et al., *Tillage and Corn Residue Harvesting Impact Surface and Subsurface Carbon Sequestration*, 44 *J. Environ. Qual.* 803 (2015) [hereinafter Clay et al., *Tillage and Corn Residue*]. 111 Clay, *Carbon Sequestration*, *supra* note 110, at 769. 112 *Id.* 28 The study’s estimate of the carbon footprint of corn, however, was based on surface samples that missed the soil organic carbon sequestration occurring even deeper in the soil. Studies testing deeper soil levels have shown that certain corn soils may sequester more carbon than previously thought. For example, a 2012 USDA study collected soil samples from as deep as 150 cm below the surface of experimental no-till fields in Nebraska, measuring changes in soil organic content over nine years. 113 The study found that improved agricultural management practices can double or even quadruple total soil organic carbon when deep soil is taken into account. 114 The study found average annual increases of more than 2 megagrams (tons) of soil organic carbon per hectare, with over 50% of the carbon being sequestered deeper than 30 cm in the soil profile. 115 The sequestration rates found by the study “greatly exceed the soil carbon credits that have been used in modeling studies to date for maize and switchgrass grown for bioenergy.” 116 Other recent USDA peer-reviewed studies have reached similar results. 117 In light of these studies, corn ethanol would receive a significant soil sequestration credit in a properly executed lifecycle analysis. Although the precise value is uncertain (soil sequestration credit values range from about 18.19g to 178.47g CO₂ e/MJ, depending on the soil depth analyzed and other factors), 118 even a low-end credit of only 18.19g would bring GREET’s current lifecycle estimate for 113 Ronald F. Follett et al., *Soil Carbon Sequestration by Switchgrass and No Till Maize Grown for Bioenergy*, 5 *Bioenerg. Research* 866, 867 (2012), available at <http://bit.ly/1QIHAPv>. 114 *Id.* at 867. 115 *Id.* at 873. 116 *Id.* 117 Ardel D. Halvorson & Catherine E. Stewart, *Stover Removal Affects No-Till Irrigated Corn Yields, Soil Carbon, and Nitrogen*, 107 *Agron. J.* 1504 (2015). 118 See Appendix II, *infra* p. 73. 29 corn ethanol down to 36.62g CO₂ e/MJ, less than half the carbon intensity of gasoline. 2.

Nitrogen Fertilizer Agriculture is the main source of nitrous oxide emissions in the United States. EPA estimates that 68% of total emissions of nitrous oxide (N₂O) result from farming soil management practices.¹¹⁹ Because N₂O is a powerful GHG pollutant, it accounts for a significant portion of the lifecycle emissions of corn ethanol (17g CO₂e/MJ).¹²⁰ Most N₂O is released primarily through the chemical process of microbial “nitrification” and “denitrification” that is stimulated when nitrogen fertilizer application exceeds plant needs.¹²¹ In 2005, USDA estimated that 95% of corn acreage received nitrogen fertilizer inputs, at an average rate of 138 lbs per acre.¹²² Taking into account corn yield increases, however, N₂O emissions per bushel have fallen by more than 20% since the 1990s,¹²³ thanks in part to new technologies such as nitrogen stabilizers, controlled release nitrogen, soil testing and remote sensing, and the use of GPS.¹¹⁹ Id. at 185. ¹²⁰ According to Argonne’s 2012 calculations, fertilizer N₂O application accounted for 17g CO₂e/MJ, and fertilizer production accounted for 10g CO₂e/MJ, of the total carbon intensity value of ethanol. See Michael Q. Wang et al., *Well-to-Wheels Energy Use and Greenhouse Gas Emissions of Ethanol from Corn, Sugarcane, and Cellulosic Biomass for US Use*, 7 *Environ. Res. Lett.* 045905, at 9 (2012). ¹²¹ NAS Report, *supra* note 49, at 185. ¹²² Id. 187. ¹²³ 2008 Energy Balance for the Corn Ethanol Industry, USDA, Table 2 (June, 2010). ³⁰ tracking technologies. ¹²⁴ But many GHG lifecycle models have not been updated to reflect the pace of industry-wide innovation. ¹²⁵ C. Ethanol Production Since EPA’s 2010 Lifecycle Assessment was first disseminated, biorefineries have become much more efficient, using less natural gas and electricity to produce each gallon of ethanol. New co-products that substitute for other products in the market have also reduced the proportion of GHG emissions that can properly be attributed to ethanol. ¹ Biorefinery Energy Efficiency As the NAS Report points out, the bulk of GHG emissions from the typical biorefinery result from natural gas and electricity usage. ¹²⁶ Ethanol biorefineries, however, have experienced dramatic gains in energy efficiency in the past few years. ¹²⁷ Dry mill ethanol plants have improved plant-wide energy consumption and thermal integration. ¹²⁸ Improvements in “[e]nergy efficiency and fuel switching . . . reduce the [carbon intensity] of corn ethanol.” ¹²⁹ ¹²⁴ See Steffen Mueller & John Kwik, 2012 Corn Ethanol, *Emerging Plant Energy and Environmental Technologies* (2013); Public Hearing for the 2014, 2015, and 2016 Standards for the Renewable Fuel Standard Program, Kansas City, KS, Testimony of Iris Caldwell & Steffen Mueller, available at <http://bit.ly/1QMnnoL>. ¹²⁵ Id. ¹²⁶ NAS Report, *supra* note 49, at 199. ¹²⁷ See generally Mueller & Kwick, *supra* note 124 (discussing industry gains in energy and process efficiency). ¹²⁸ More energy-intensive wet mill plants have become increasingly scarce. Today, it is estimated that “[d]ry mill plants correspond to 83% of U.S. capacity and have experienced a 90% growth in production since 2000. Wet mill plants today account for only 10 to 12% of installed capacity, and less than 10% of the total number of plants.” ¹²⁸ Boland & Unnasch, *supra* note 49, at 18. ¹²⁹ Id. at viii. ³¹ Most biorefineries have completed the switch from coal to less carbonintensive natural gas. ¹³⁰ By 2012, only 13% of U.S. ethanol production capacity used coal as a thermal energy source. ¹³¹ Ethanol plants have also dramatically reduced their energy needs (and electricity demand) through innovation. From 36,000 Btu per gallon of ethanol in 2000, biorefineries have reduced their energy consumption to less than 24,000 Btu on average for 2012, and less than 20,000 Btu for some biorefinery configurations. ¹³² Moreover, biorefinery yields have increased by about 10% in the last 20 years, so a bushel of corn produces more ethanol. ¹³³ As reflected by Argonne’s most recent GREET model, reductions in energy use and improved biorefinery yields translate into a reduced carbon intensity value for corn ethanol. ¹³⁴ These reductions will grow in the future due to the increasing use of lignin (corn residue) to substitute for natural gas, and other biorefinery process innovations. ¹³⁵ ¹³⁰ In general, using natural gas to power biorefineries has lower GHG emissions than using coal, and using biomass may have lower emissions still. NAS Report, *supra* note 49, at 195. ¹³¹ Mueller & Kwick, *supra* note 124, at 1. ¹³² See id. at iv–v; Hosein Shapouri et al, USDA, *The Energy Balance of Corn Ethanol: An Update*, AER-814 (2001). ¹³³ 2008 Energy Balance for the Corn Ethanol Industry, USDA, Table 2 (June, 2010). ¹³⁴ See Zhichao Wang et al., *Updates to the Corn Ethanol Pathway and Development of an Integrated Corn and Corn Stover Ethanol Pathway in the GREET Model*, ANL/ESD-14/11, at 3 (2014). ¹³⁵ Id. at 1 (“Co-located corn stover and corn ethanol plants have the potential to reduce the costs, energy consumption, and [GHG] emissions of ethanol production because these facilities could burn the corn stover, or its lignin fraction, to produce process energy, reducing the need for consumption of fossil energy sources such as natural gas. Moreover, process utility integration between the grain- and stover-based ethanol plants is a possibility that could also reduce energy consumption and subsequent GHG emissions.”). ³² ² Biofuel Co-Products a. Distillers’ Grains Modern ethanol plants produce more

valuable co-products than in the past, reducing the carbon emissions of their market substitutes. Distillers' grains are an important economic component of ethanol production at dry mills, 136 providing on average 10% to 20% of total plant revenues. 137 Dry milling generates on average 15 pounds per bushel of fiber-rich distillers' dried grains with solubles (DDGS), which can be used as a higher quality feedstock to substitute for soy, primarily in ruminant diets. This substitution or "displacement" results in a carbon credit, lowering the lifecycle emissions of corn ethanol. 138 Many studies in the past erroneously assumed that DDGS are nutritionally equivalent to corn, 139 allegedly because a bushel of corn used for dry mill ethanol production yields DDGS equal to about a third of the corn's original weight. 140 EPA did not commit this basic error; based on a 2008 Argonne study, the Agency estimated a "maximum" substitution rate of 1.196 pounds of corn. 141 But this figure 136 NAS Report supra note 49, at 30, 136–37. 137 Salil Arora et al., Estimated Displaced Products and Rations of Distillers' Co-Products from Corn Ethanol Plants and the Implications of Lifecycle Analysis, 1 *Biofuels* 911, 912 (2012), available at <http://1.usa.gov/1UUjGSZ>. 138 In 2012, for example, Argonne estimated a distillers' grains credit of 14 CO₂ e/MJ for corn ethanol. Wang et al., supra note 120, at 9. 139 Rita Mumm et al., Land Usage Attributable to Ethanol Production in the United States: Sensitivity to Technological Advances in Corn Grain Yield, Ethanol Conversion, and Co-Product Utilization, *Biotech. for Biofuels* 7, 14 (2014) ("Thus, it is assumed that DDGS included in diets fed to beef cattle replaces corn at a 1:1 rate, although it is acknowledged that substitution rates of 1.1:1 or 1.2:1 have been proposed."). 140 NAS Report supra note 49, at 30. 141 2010 RFS Rule, 75 Fed. Reg. at 14,836 ("For the proposal, we assumed that one pound of DGS replaced one pound of total of corn and soybean meal for all fed animals. We received numerous comments on this assumption. Many commenters suggested that we adopt the replacement 33 is too low given new evidence. 142 A recent USDA study predicts that 1 pound of DDGS substitutes for approximately 1.22 pounds of corn when used to feed beef cattle—more than EPA and Argonne predicted in the past. 143 b. Corn Oil More recently, Argonne scientists have updated the GREET carbon intensity calculation for corn ethanol to reflect the emergence of corn oil as a significant coproduct of ethanol. Over 80% of the dry mill ethanol plants now generate corn oil for biodiesel plants. 144 A bushel of corn currently produces about 0.53lb of corn oil or more. 145 And while corn oil production results in negligible decreases in DDGS, corn rates included in the recent research by Argonne National Laboratory (ANL) and others. The ANL study found that one pound of DGS can be used to replace 1.196 pounds total of corn and soybean meal for various fed animals due to the higher nutritional content of DGS per pound compared to corn and soybean meal. For the final rulemaking analysis, these replacement rates are incorporated in both the FASOM and FAPRI–CARD models, and are treated as a maximum replacement rate possibility that is fully phased in by 2015." (footnote call omitted)). 142 Argonne recently investigated whether new corn oil extraction rates from DDGS could reduce its performance as animal feed, reducing its replacement value. Argonne concluded that there was not enough evidence to "adjust DGS conventional feed displacement ratios in GREET." Wang et al., supra note 134, at 4. 143 Linwood Hoffman & Allen Baker, USDA Econ. Res. Serv., Estimating the Substitution of Distillers' Grains for Corn and Soybean Meal in U.S. Feed Complex, FDS-11-I-01, at 30 (2011); see also Salil Arora et al., Estimated Displaced Products and Ratios of Distillers' Co-Products from Corn Ethanol Plants and the Implications of Lifecycle Analysis, 1 *Biofuels* 911 (2010). It should also be noted that some lifecycle analyses have failed to credit the nutritional value of excess stover used for feed. But stover for feed is quite common in certain areas of the Corn Belt. See Steffen Mueller, Handling of Co-Products in Life Cycle Analysis in an Evolving Co-Product Market: A Case Study with Corn Stover Removal, 3 *Advances in Appl. Agr. Sci.* 8 (2015). 144 See Zhichao Wang et al., Argonne Nat'l Lab., Updates to Corn Ethanol Pathway and Development of an Integrated Corn and Corn Stover Ethanol Pathway on the GREET Model, ARGONNE/ESD-14/11 (2014). 145 Id. at 3. More recent data suggests that biorefineries in 2012 produced 0.55 lbs of soy oil per bushel of corn. See Scott Irwin, The Profitability of Ethanol Production in 2015, 6 *Farmdoc Daily*, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, (Jan. 6, 2016), available at <http://bit.ly/1phwLdh>. 34 oil displaces soy oil used as a feedstock for biodiesel, reducing net GHG emissions. 146 GREET has been updated to include a one-to-one displacement credit to account for the displacement of soy oil. 147 EPA has not updated its 2010 Lifecycle Analysis to reflect this change. D. Gasoline Production Since EPA published its lifecycle estimates in 2010, petroleum-based fuels have become more carbon-intensive. As a result, the baseline gasoline carbon intensity value that EPA relied upon in the 2010 RFS Rule is inaccurate. Gasoline GHG emissions are trending upwards because of increased "use of oil sands and other nonconventional sources of petroleum." 148 As the NAS Report noted in 2011, a proper

“comparison scenario” for ethanol should include marginal GHG emissions “resulting from any change in the use of oil sands and other nonconventional sources of petroleum.” 149 But unlike renewable fuels, gasoline producers are not held to account for their increased GHG emissions. 150

146 Wang, *supra* note 144, at 4. 147 *Id.* at 5. 148 Susan Boland & Stefan Unnasch, *Life Cycle Associates, Carbon Intensity of Marginal Petroleum and Corn Ethanol Fuels*, LCA.6075.83.2014 (2014); Jeremy Martin, *Union of Concerned Scientists, Fueling a Clean Transportation Future*, at 1 (2016) (“As oil companies increasingly go after unconventional, hard-to-reach sources such as tar sands and use more intense extraction techniques such as hydraulic fracturing (fracking), dirtier sources of oil have become an increasingly large part of the mix, and wasteful practices are needlessly increasing emissions.”). Oil is the largest fossil fuel contributor to global warming in the United States, contributing more than coal and natural gas. *Id.* at 8. 149 NAS Report, *supra* note 49, at 195. 150 See Martin, *supra* note 148, at 5 (“[E]lectricity and biofuels are getting cleaner because producers are subject to careful scrutiny of the global warming emissions associated with the fuels’ production, and public policy is holding producers accountable to reduce these emissions. However, the same level of scrutiny is not being applied to the different sources and methods of producing gasoline. In addition, oil companies are not obligated to reduce emissions from their supply chains. For the United States to avoid the worst consequences of climate change, all fuel producers have to 35 Methane flares from shale oil extraction dramatically increase GHG emissions. 151 And tar sand recovery often requires carbon-intensive steam injection, additional carbon-intensive processing to separate bitumen from tar sands, and chemicals to reduce the viscosity of the product for transportation, increasing extraction emissions. 152 Emissions associated with refining a barrel of tar sand oil are also higher. 153 And even conventional oil is becoming more carbon-intensive. Oil producers are injecting steam, chemicals, and gases (including methane) to enhance oil recovery, increasing the energy and carbon intensity of conventional oil extraction. 154 EPA’s 2010 Lifecycle Analysis significantly understates the carbon intensity of gasoline. 155 When EPA’s skewed carbon intensity baseline for gasoline is corrected, corn ethanol is an even more attractive substitute. Because of tight oil, the carbon intensity of gasoline is no longer 93.01g, but 96.89g CO₂ e/MJ. 156 Because minimize their global warming pollution.”). While regulation might help mitigate GHG emissions from tight oil, “[t]he most obvious way for the United States to reduce the problems caused by oil use is to steadily reduce oil consumption through improved efficiency and by shifting to cleaner fuels.” *Id.* at 7, 12. 151 *Id.* at 16–17. 152 *Id.* at 19–20. 153 *Id.* at 20. 154 *Id.* at 15. 155 Boland & Unnasch, *supra* note 55, at v. Argonne in particular has undertaken major studies of Canadian oil sands, demonstrating that Canadian oil sand products are much more GHG-intensive than previously thought. Hao Cai et al., *Well-to-Wheels Greenhouse Gas Emissions of Canadian Oil Sands Products: Implications for U.S. Petroleum Fuels*, 49 *Environ. Sci. Technol.* 8219 (2015); Jacob G. Englander, *Oil Sands Energy Intensity Assessment Using Facility-Level Data*, 29 *Energy Fuels* 5204 (2015). See also Adam R. Brandt, *Argonne Nat’l Lab., Energy Intensity and Greenhouse Gas Emissions from Crude Oil Production in the Bakken Formation: Input Data and Analysis Methods* (September 2015). 156 *Id.* 36 tight oil’s share of the gasoline market is likely to increase in the future, the carbon impact of petroleum-based fuels is likely to increase as well. This comparison tilts even further in ethanol’s favor because aromatic hydrocarbons (for which ethanol substitutes in gasoline blends) are among the most energy-intensive (and thus carbon-intensive) products of the refining process. 157 E. Tailpipe Emissions 1. Black Carbon While EPA focused heavily on GHG emissions, it failed to consider the climate-forcing effects of black carbon, or “elemental carbon,” 158 more commonly known as “soot,” which is a form of particulate matter commonly emitted from light-duty vehicle tailpipes. 159 This lapse is significant; the climate forcing effects of black carbon are estimated to be second only to the effects of CO₂ as an agent of climate change. 160 157 Because ethanol has a high octane number, it allows refineries to displace carbon-intensive reformat aromatics from the blendstock, reducing GHG emissions. See Vincent Kwasniewski et al., *Petroleum Refinery Greenhouse Gas Emission Variations Related to Higher Ethanol Blends At Different Gasoline Octane Rating And Pool Volume Levels*, 10 *Biofuels, Bioprod. Bioref.* 36, 44 (2016), available at <http://bit.ly/1RB2gp1>. 158 The term is interchangeably used with the term elemental carbon, or EC. The terms refer to different measurement methods that capture roughly the same substance. See *Final Revisions to the National Ambient Air Quality Standards for Particulate Matter, Regulatory Impact Analysis*, at 6-39 (2012) [hereinafter *PM RIA*] (“BC and elemental carbon (EC)(or particulate elemental carbon (PEC)) are used interchangeably in this report because EPA traditionally estimates EC emissions rather than BC and for the purpose of this analysis these measures are essentially equivalent.”), available at <http://1.usa.gov/24S42Mf>; see also

Gwami Shrestha et al., *Black Carbon's Properties and Role in the Environment: A Comprehensive Review*, 2 Sustainability 294, 307 (2010), available at <http://bit.ly/1p9vrZf>. 159 See Gwami Shrestha et al., *Black Carbon's Properties and Role in the Environment: A Comprehensive Review*, 2 Sustainability 294, 307 (2010), available at <http://bit.ly/1p9vrZf>. 160 V. Ramanathan, *Indian Ocean Experiment: An Integrated Analysis of the Climate Forcing and Effects of the Great Indo-Asian Haze*, 106 J. Geophys. Res. 28,371 (2001), available at 37. The very same year that EPA published its 2010 Lifecycle Analysis, EPA acknowledged black carbon's role as a climate-forcing agent. 161 The scientific literature has linked black carbon to "increased temperatures, accelerated ice and snow melt, and disruptions on precipitation patterns." 162 Black carbon's "climate forcing" potential rests on its capacity to absorb sunlight and darken snow and ice covers, decreasing reflectivity. Vehicle and fuel emissions studies have repeatedly linked particulate matter emissions, and black carbon in particular, with the use of aromatic additives used to raise octane. 163 In fact, some studies trace substantially all black carbon emissions from light-duty gasoline vehicles to incomplete combustion of aromatic hydrocarbons. 164 Mobile sources are responsible for a majority of black carbon emissions. 165 Gasoline-powered vehicles in particular are major contributors to black carbon <http://1.usa.gov/1QFheN8>; Chul E. Chung et al., *Global Anthropogenic Aerosol Direct Forcing Derived from Satellite and Ground-Based Observations*, 110 J. Geophys. Res. D24207 (2005), available at <http://bit.ly/1M85YVv>. 161 EPA, *Report to Congress on Black Carbon: Department of the Interior, Environment, and Related Agencies Appropriations Act, 2010*, at 11 (2012) [hereinafter *Black Carbon Report*], available at <http://1.usa.gov/1UUK9EB>. 162 Id. 163 James E. Anderson et al., *Issues with T50 and T90 as Match Criteria for Ethanol-Gasoline Blends*, 7 SAE Int. J. Fuels Lubr. 1027, 1031 (2014) ("As discussed in several papers, high-boiling point gasoline hydrocarbons with low vapor pressure and high-double-bond equivalent (DBE) value, primarily aromatics, hydrocarbons, have been identified as the predominant contributors to PM emissions"); Koichiro Aikawa et al., *Development of a Predictive Model for Gasoline Vehicle Particulate Matter Emissions*, 3 SAE Int. J. Fuels Lubr. 610 (2010). 164 See J.R. Odum et al., *The Atmospheric Aerosol-Forming Potential of Whole Gasoline Vapor*, 276 Science 96, 96 (1997). Because aromatics are "high-distillate," they do not burn during combustion, and they are emitted from the tailpipe as part of vehicle exhaust. See Aikawa et al., *supra* note 163, at 611. 165 *Black Carbon Report*, *supra* note 161, at 88. 38 pollution. According to a recent CARB study, elemental carbon accounts for approximately 70% of all PM mass emissions from gasoline-powered light duty vehicles. 166 Moreover, recent evidence shows that emissions of black carbon from light duty gasoline-powered vehicles are likely an order of magnitude greater than previously estimated. 167 Somewhat counterintuitively, new technologies, like gasoline direct injection (GDI) engines, have increased black carbon emissions from gasoline-powered vehicles. 168 As a substitute for gasoline aromatics, ethanol reduces particulate emissions in general, and black carbon in particular, reducing the risk of global warming. 169 Significantly greater black carbon reductions would be possible with higher levels of ethanol. 170 2. Further GHG Reductions from Mid-level Ethanol Blends Tailpipe CO₂ emissions following fuel combustion are the largest source of GHG emissions in the lifecycle of most fuel sources, accounting for 72g CO₂ e/MJ in 166 California Air Resources Board, *LEV III PM Technical Support Document: Development of Particulate Matter Mass Standards for Future Light-Duty Vehicles* 123 (Dec. 7, 2011). 167 John Liggio et al., *Are Emissions of Black Carbon from Gasoline Vehicles Underestimated? Insights from Near and On-Road Measurements*, 46 *Envtl. Sci. & Tech.* 4819 (2012). 168 Robert A. Stein et al., *Ethanol Blends' Impacts on SI Engine Performance, Fuel Efficiency, and Emissions*, SAE Int. J. Engines 470 (2013); John Liggio et al., *Are Emissions of Black Carbon from Gasoline Vehicles Underestimated? Insights from Near and On-Road Measurements*, 46 *Envtl. Sci. & Tech.* 4819 (2012). 169 See Hao Cai & Michael Wang, DOE Argonne Nat'l Lab., *Estimation of Emission Factors of Particulate Black Carbon and Organic Carbon from Stationary, Mobile, and Non-point Sources in the United States for Incorporation into GREET*, ANL/ESD-14/6, at 23 (2014) ("Gasoline with ethanol blending reduces BC emissions compared with gasoline"), available at <http://1.usa.gov/1QHUCgi>. 170 See M. Matti Maricq et al., *The Impact of Ethanol Fuel Blends on PM Emissions from a Light Duty GDI Vehicle*, 46 *Aerosol Sci. & Tech.* 576, 581 (2011) (Black carbon "decreases slightly from 0% to 17% ethanol, but falls by 45% for E32 and E45."). 39 E10 vehicles, out of 86g CO₂ e/MJ. 171 While ethanol has a lower energy content per gallon than gasoline, ethanol also has a lower carbon content per unit of energy than gasoline. Thus, on a grams-per-mile basis, the tailpipe GHG emissions of ethanol are lower than gasoline's. 172 And ethanol has the potential to achieve even greater tailpipe GHG reductions, because higher concentrations of ethanol, in the form of mid-level ethanol blends, would

enable more efficient engines. Many studies have shown that ethanol's high octane rating (the knock-resistant quality of fuel) can be harnessed to increase vehicle fuel economy, reducing both lifecycle emissions¹⁷³ and tailpipe GHG emissions on a grams-per-mile basis.¹⁷⁴

¹⁷¹ See, e.g., Hao Cai et al., *Regional Differences in Life-Cycle Greenhouse Gas and Criteria Pollutant Emissions of Light-Duty Vehicles in the United States*, at 11, available at <http://1.usa.gov/1pyymeL>.¹⁷² See Stein et al., *supra* note 168, at 9 (“CO₂ emissions per unit of heating value [energy content] . . . are about 3% lower for ethanol than for gasoline. The cumulative effect of improved efficiency and lower H/C ratio is an improvement in CO₂ emissions of about 6–9% for ethanol compared to gasoline at equal [brake mean effective pressure (BMEP)] and engine speed at [minimum spark advance for the best torque (MBT)]. For ethanol-gasoline blends, it is expected that this benefit in CO₂ emissions will scale approximately linearly with the molar fraction of ethanol in the blend.”); Hosuk H. Jung et al., *Effect of Ethanol on Part Load Thermal Efficiency and CO₂ Emissions of SI Engines*, 6 *SAE Int. J. Engines* (2013).¹⁷³ Transitioning to higher ethanol blends would substantially reduce refinery GHG emissions. See also Kwasniewski et al., *supra* note 157; David Hirshfeld et al., *Refining Economics of U.S. Gasoline: Octane Ratings and Ethanol Content*, 48 *Environ. Sci. & Technol.* 11064, at S128 (2014).¹⁷⁴ See, e.g., Jeongwoo Han et al., DOE Argonne Nat'l Lab., *Wells-to-Wheels Greenhouse Gas Analysis of High-Octane Fuels with Various Market Shares and Ethanol Blends*, ANL/ESD15/10 (2015); Thomas G. Leone et al., *The Effect of Compression Ratio, Fuel Octane Rating, and Ethanol Content on Spark-Ignition Engine Efficiency*, 49 *Environ. Sci. Tech. Lett.* 10778 (2015); Thomas G. Leone, *Effects of Fuel Octane Rating and Ethanol Content on Knock, Fuel Economy, and CO₂ for a Turbocharged DI Engine*, 7 *SAE J. of Fuels & Lubricants* 9 (SAE Technical Paper No. 2014-01-1228); Derek A. Splitter & James P. Szybist, *Experimental Investigation of Spark-Ignited Combustion with High-Octane Biofuels and EGR. 1. Engine Load Range and Downsize Downsized Opportunity*, 28 *Energy & Fuels* 1418 (2014); Raymond L. Speth, *Economic and Environmental Benefits of Higher-Octane Gasoline*, 48 *Environ. Sci. Technol.* 48, 6561 (2014); Eric Chow, *Exploring the Use of a Higher Octane Gasoline for the U.S. Light-Duty Vehicle Fleet*, available at <http://bit.ly/1TtytEL>.⁴⁰ Ethanol's high Research Octane Number would enable vehicle manufacturers to build next-generation engines with higher compression ratios, and therefore increased thermal efficiency. By increasing the current engine compression ratio by two points (from 10:1 to 12:1), vehicle manufacturers could increase vehicle efficiency by 5% to 7%; increasing the compression ratio by three points (from 10:1 to 13:1) could increase vehicle efficiency by 6% to 9%.¹⁷⁵ These efficiency gains can be translated into improved fuel economy through engine downsizing and other proven engineering strategies.¹⁷⁶ A recent study estimates that increasing an engine compression ratio by a single point would require a 2.5 to 6 increase in the research octane number (RON) of the fuel, in order to avoid engine knock.¹⁷⁷ Ethanol—a well-known octane enhancer—is a proven, low-GHG substitute for the aromatic additive components in gasoline.¹⁷⁸ A recent Oak Ridge National Laboratory study of mid-level ethanol found that the use of an E30 blend in optimized spark-ignited engines would result in significant increases in engine efficiency and provide expanded downsizing and downsizing opportunities, which can translate into significant improvements in vehicle fuel economy.¹⁷⁹

¹⁷⁵ See David Hirshfeld et al., *Refining Economics of U.S. Gasoline: Octane Ratings and Ethanol Content*, 48 *Environ. Sci. & Technol.* 11064, 11065 (2014).¹⁷⁶ Jeongwoo Han et al., DOE Argonne Nat'l Lab., *Wells-to-Wheels Greenhouse Gas Analysis of High-Octane Fuels with Various Market Shares and Ethanol Blends*, ANL/ESD-15/10, at 44 (2015); Derek A. Splitter & James P. Szybist, *Experimental Investigation of Spark-Ignited Combustion with High-Octane Biofuels and EGR. 1. Engine Load Range and Downsize Downsized Opportunity*, 28 *Energy & Fuels* 1418 (2014).¹⁷⁷ Hirshfeld, *supra* note 175, at 11065; Raymond L. Speth et al., *Economic and Environmental Benefits of Higher-Octane Gasoline*, 48 *Environ. Sci. Technol.* 48, 6561 (2014).¹⁷⁸ Splitter & Szybist, *supra* note 176.¹⁷⁹ *Id.*⁴¹ Tailpipe GHG reductions from increased compression engines would be significant. A 2014 study conducted by Ford and GM concluded that blending E30 to produce a 101 RON fuel for use in high-compression engines could reduce baseline tailpipe GHG emissions by 7%.¹⁸⁰ Other studies have reached similar conclusions. A 2013 MIT study estimates that engine efficiencies enabled by mid-level ethanol blends could reduce 35 million tons of CO₂ annually, with fuel savings of up to \$6 billion for consumers at the pump.¹⁸¹ Indeed, recent estimates show that splash-blending an additional 20% of ethanol into an E10 fuel to create a 93 AKI fuel (equivalent to today's premium blend of gasoline) would cost 9 cents a gallon less than regular gasoline using 2014 prices.¹⁸² Finally, an Argonne lifecycle study simulating several market-penetration scenarios for mid-level ethanol blends found that the change in lifecycle GHG emissions “was dominated by the positive impact associated with vehicle efficiency gains and ethanol

blending levels.” 183 In particular, the “5% and 10% MPGGE [miles per gallon of gasoline-equivalent] gains” achieved through mid-level ethanol blends reduced lifecycle GHGs “by 4% and 8%, respectively.” 184 A blend of E40 with a 100 180 Thomas G. Leone et al., *The Effect of Compression Ratio, Fuel Octane Rating, and Ethanol Content on Spark-Ignition Engine Efficiency*, 49 *Environ. Sci. Tech. Lett.* 10778, 10785 (2015). 181 Speth et al., *supra* note 177. The study modeled the benefits of transitioning from regular octane to current premium fuel octane values (98 RON), with different ethanol volumes (E10, E15, E20). The study concluded that a 98 RON would improve net CO₂ emissions by as much as 35 million tons per year in 2040. *Id.* at 6561. E10 fuels would not be able to achieve such high octane levels without the addition of costly and carbon-intensive aromatic hydrocarbons that harm human health. See Hirshfield, *supra* note 175, at S128. 182 Thomas Darlington et al., *The Economics of Eco-Performance Fuel*, at 2 (Apr. 22 2014), available at <http://bit.ly/1pzkKzU>. 183 Jeongwoo Han et al., *supra* note 176, at xii. 184 *Id.* 42 RON could reduce GHG lifecycle emissions by 18%, while delivering a 10 mile-pergallon increase in vehicle fuel economy. 185 The best information available therefore shows that significant additional GHG reductions could be achieved through mid-level blends of ethanol. EPA’s 2010 Lifecycle Analysis, however, entirely fails to account for the possibility of a mid-level ethanol future. * * * In 2010, EPA predicted that blending corn ethanol into gasoline would significantly reduce GHG emissions. The Agency was right about that, but ethanol is even better at cutting carbon emissions than EPA gave it credit for. In the 2010 RFS Rule, EPA estimated corn ethanol would have a carbon intensity of 74.81g CO₂ e/MJ in 2022, relative to the baseline gasoline carbon intensity of 93.01g CO₂ e/MJ. 186 A recent conservative estimate would place corn ethanol’s carbon intensity at 59.21g CO₂ e/MJ and gasoline’s carbon intensity at 96.89g CO₂ e/MJ— without any credit for soil carbon sequestration. 187 When updated to reflect Argonne’s latest estimate for land-use change in a conventional-till scenario, the carbon intensity of corn ethanol falls to 54.81g CO₂ e/MJ. 188 And when further updated to reflect recent estimates for soil carbon sequestration, the carbon intensity of corn ethanol falls by an additional 18.19 to 178.47g, to a carbon intensity ranging from 36.62 to negative 123.66g CO₂ e/MJ. 189 This means that over their respective lifecycles, ethanol results in 60.27% to 227.63% less carbon pollution than gasoline 185 *Id.* at xiii. 186 2010 RFS Rule, 75 Fed. Reg. 14,788. EPA reported the carbon intensity of corn ethanol as 79g CO₂ e/mmBTU (equivalent to 74.82g CO₂ e/MJ) with a range of 54 to 97g CO₂ e/mmBTU (or 51.14 to 91.86g CO₂ e/MJ). EPA’s baseline gasoline carbon intensity for the year 2005 was 98.205g CO₂ e/mmBTU (or 93.01g CO₂ e/MJ). 2010 RFS RIA, *supra* note 1, at 467. 187 Boland & Unnasch, *supra* note 54, at 20. 188 GREET1_2015 (summarized in Appendix I, *infra* p. 69). 189 See *supra* p. 25; Appendix II, *infra* p. 73 43 on an energy-equivalent basis. And that does not account for the fuel efficiency gains that are possible with higher ethanol blends. The GHG benefits of ethanol will only grow as ethanol production becomes increasingly efficient, and gasoline production continues to get dirtier. EPA’s current GHG lifecycle analysis is clearly in need of correction. IV. CONVENTIONAL AIR POLLUTANTS As with GHG emissions, new evidence shows that corn ethanol produces less air pollution over its lifecycle than previously estimated, significantly outpacing projections of the ethanol industry’s efficiency gains. But EPA continues to disseminate its 2010 Lifecycle Analysis and its 2011 Report to Congress, which do not account for the latest innovations in corn ethanol production. Nor does EPA’s analysis take into account the growing market share of “tight oil,” which increases lifecycle emissions from gasoline. As a result, EPA’s lifecycle analyses do not accurately model the conventional air pollution emissions attributable to ethanol and gasoline. New evidence from fuel emissions studies shows that blending ethanol into gasoline has already significantly reduced tailpipe emissions and that these reductions would be even more pronounced for mid-level ethanol blends. Because EPA has the authority to facilitate the switch to higher ethanol blends, the Agency should consider studies that show additional lifecycle reductions from transitioning to mid-level blends of ethanol. The EPA’s analysis of the RFS’s air quality effects is methodologically flawed, incomplete, and out of date. At every stage in the fuel life cycle, corn ethanol is now cleaner, and gasoline dirtier than EPA estimated. 44 A. Lifecycle Analysis of Conventional Pollutants Few studies have comprehensively modeled the lifecycle impacts of ethanol and gasoline on non-GHG emissions. 190 While some early studies focused on PM_{2.5} and its precursors, 191 EPA’s 2010 Lifecycle Analysis emphasized increases in groundlevel ozone, or “smog,” from increased emissions of nitrogen oxides (NO_x), volatile organic compounds (VOCs), 192 and carbon monoxide (CO) from biofuel production 190 See *supra* pp. 30–32. For an early but outdated example, see Jason Hill et al., *Climate Change and Health Costs of Air Emissions from Biofuels and Gasoline*, 106 *PNAS* 2077 (2009), which EPA cited in the 2011 Report to Congress. See 2011

Report to Congress, *supra* note 7, 3-23 191 PM is a mixture of solid particles and liquid droplets suspended in the atmosphere. PM is classified as either “primary” PM—particulates emitted directly into the atmosphere from a tailpipe or smoke stack—or “secondary” PM, which is formed through complex atmospheric reactions when gases interact with particles. Control of Air Pollution From Motor Vehicles, Tier 3 Rule Motor Vehicle Emission and Fuel Standards, 79 Fed Reg. 23414, 23429 (Apr. 28, 2014) [hereinafter Tier 3 Rule]. For regulatory purposes, EPA also classifies PM according to particle diameter—fine particles of less than 2.5 micrometers in diameter are classified as PM 2.5 . PM 2.5 is more dangerous than PM 10 , because it penetrates deeper into the lungs, entering into the bloodstream. EPA, Integrated Science Assessment for Particulate Matter 3–6 (2009). PM 2.5 is associated with a host of negative health effects, including premature death, cardiovascular problems, developmental delay, and carcinogenic, mutagenic, and genotoxic effects, most prominently, lung cancer. Tier 3 Rule, 79 Fed Reg. at 23430. PM has been designated by the World Health Organization as a Group 1 carcinogen. World Health Organization, 109 IARC Monographs on the Evaluation of Carcinogenic Risks to Humans: Outdoor Air Pollution 443 (2015). 192 VOCs photochemically react to form ozone, but not all VOCs are created equal when it comes to ozone. The smog-forming potential of VOCs depends on their relative tendency to react with sunlight to create ozone—their ozone-forming potential. See National Academy of Sciences, Ozone-Forming Potential of Reformulated Gasoline 33–72 (1999) (discussing VOCs and the science of ozone reactivity). EPA excludes organic compounds with low photochemical reactivity such as methane from its definition of VOCs. 40 C.F.R. 51.100(s) (defining VOC to mean “any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions.”). Immediately following the definition is a list of organic compounds that “have been determined to have negligible photochemical reactivity.” *Id.* The two most important organic compounds that are not classified as VOCs are methane and ethane. *Id.* 45 under the RFS. 193 EPA estimated between 36 and 160 additional cases of adult mortality from exposure to ozone as a result of the RFS. 194 Following the 2010 Lifecycle Analysis, EPA released its 2011 Report to Congress and EPA scientists led by Rich Cook published their lifecycle analysis of the RFS in a peer-reviewed journal, focusing on “criteria” pollutants and on certain species of “air toxics”—pollutants that cause cancer and other health effects. 195 In its peer-reviewed study, EPA found “little net impact” on the overall cancer risk as a result of the RFS. 196 Ozone concentrations, by contrast, would increase in some (but not all) areas by as much as 1 part per billion—mostly as a result of increased NO X and VOC emissions from agriculture, biorefineries, and fuel combustion. 197 EPA scientists conceded that significant uncertainty remained in the modeling of ozone emissions, especially given limited data on the tailpipe effects of E10 in modern vehicles. 198 193 Ozone is known to cause asthma, pulmonary inflammation, and premature death. Studies have also associated ozone with heart problems and vascular disease. See National Ambient Air Quality Standards for Ozone, 80 Fed. Reg. 65292, 65302 (Oct. 26, 2015). It is the product of photochemical reactions of VOCs, NO X , and CO in the atmosphere. *Id.* at 65299. Ozone formation depends on heat and sunlight; prolonged high temperatures and sunlight with stagnant air can build up ozone in the atmosphere. *Id.* at 65300. The reactions are complex and non-linear. Proposed Revisions to the National Ambient Air Quality Standards for Ground-Level Ozone, Regulatory Impact Analysis, at 2-1 (2015). When VOCs levels are high relative to NO X , as in rural areas, NO X tends to increase ozone. By contrast, when VOC levels are low relative to NO X , as in many urban areas, increases in NO X may actually decrease ozone. *Id.* 194 2010 RFS RIA, *supra* note 1, at 5. 195 Rich Cook et al., Air Quality Effects of Increased Use of Ethanol under the United States’ Energy Independence and Security Act, 45 Atmospheric Environ. 7714, 7714 (2011). 196 *Id.* at 7723. 197 Cook predicted that in urban (NO X saturated) areas with serious ozone problems—for example, southern California—increases in NO X emissions would reduce ozone by more than 0.05 parts per billion. *Id.* at 7718. 198 *Id.* at 7723. 46 Subsequent studies and technological innovations have demonstrated that the 2010 Lifecycle Analysis is not a reliable or useful measure of the current lifecycle emissions of either ethanol or gasoline. B. Corn Agriculture Feedstock production is responsible for a substantial portion of the expected air pollution costs of ethanol. 199 Farmers emit PM by using tractors and other diesel equipment, by tilling soils, and by applying fertilizer and pesticides to the soil, which emit PM and PM precursors during the production, transportation, and application process. 200 In 2010, corn ethanol fared poorly relative to biofuel alternatives “because it requires, per unit of fuel produced, more fossil fuel and fertilizer inputs that emit large amounts of . . . PM 2.5 .” 201 But as a 2009 study noted, the “[e]nvironmental costs per unit of ethanol decline with higher biomass yield, lower fertilizer and fuel inputs into biomass production, and improvements in biomass to biofuel conversion

efficiencies.” 202 Just as predicted, the adoption of no-till, reduced-till, and conservation farming has reduced NO_x, PM_{2.5} and PM₁₀ emissions in the Corn Belt, by reducing both dust from the disturbance of soils, and diesel used during tillage. This trend is likely to continue in the future, as farmers realize higher crop yields from no-till and reduced-tillage practices. 203 The use of GPS technology and new harvesting techniques—like single pass—have also allowed farmers to reduce diesel consumption and the consequent NO_x and PM_{2.5} emissions. 204 Reductions in NO_x from agriculture are expected to continue as the States find ways to comply with EPA’s new ozone standards. 205 PM_{2.5} and NO_x lifecycle emissions from corn production have fallen in response to new technologies and improvements in farming. As discussed above, corn yields have increased while nitrogen application rates have remained constant. 206 Farmers have invested in controlled-release nitrogen technologies that apply nitrogen efficiently and limit NO_x and NH₃ formation, further reducing the per-gallon PM_{2.5} emissions of ethanol. 207 C. Petroleum Extraction A 2009 study warned that “a shift from crude oil to oil sands . . . would greatly increase emissions, unless accompanied by simultaneous improvements in abatement technology.” 208 That warning has proven true, and no abatement panacea has emerged. Since EPA first disseminated its 2010 Lifecycle Analysis, “tight oil” sources have claimed an ever larger share of the market, and dirty sources of crude oil are expected to become the new normal. Tar sands, a notoriously dirty source of gasoline, accounted “for 9.4% of the total crudes processed in U.S. refineries in 2013,” and that level is “forecast to reach 13.6% in 2020.” 209 Shale oil, also dirtier than conventional oil, accounted for 50% of U.S. crude oil production in 2015. 210 New evidence shows that the shift to tight oil sources has significantly increased gasoline’s lifecycle emissions of PM_{2.5}, VOCs, NO_x, and carcinogenic hydrocarbons like benzene and polycyclic aromatic hydrocarbons (PAHs). 1. Tar Sands Extraction Canadian tar sands or oil sands are “one of the world’s dirtiest and most environmentally destructive sources of fuel.” 211 Tar sand deposits consist of water, sand, and bitumen, which can be recovered via surface mining or steam injection. 212 After the bitumen is recovered, it is either upgraded to synthetic crude oil using an energy-intensive combination of heat, water, pressure, and catalysts on site, or diluted for further transportation. 213 Because bitumen is a highly dense and viscous substance, toxic chemicals are added to reduce the viscosity of the substance for transportation via pipelines. 214

209 Cai et al., supra note 155; Englander et al., supra note 155. 210 Marcelo Prince & Carlos A. Tovar, How Much U.S. Oil and Gas Comes From Fracking? Wall Street J. (Apr. 1, 2015), <http://on.wsj.com/1G6QAtt>. 211 NRDC, Tar Sands Crude Oil: Health Effects of a Dirty and Destructive Fuel, Issue Brief, at 1 (Feb. 2014), available at <http://on.nrdc.org/1P0Tzm6>. 212 Erin N. Kelly et al., Oil Sands Development Contributes to Polycyclic Aromatic Compounds to the Athabasca River and Its Tributaries, 106 PNAS 22346, 22346 (2009). 213 Kelly et al., supra note 212; Cai et al., supra note 155; Martin, supra note 148, at 19–20 (discussing how tar sand extraction leaves behind highly polluted water). 214 See National Academy of Sciences, Spills of Diluted Bitumen from Pipelines: A Comparative Study of Environmental Fate, Effects, and Response, at 24 (2015). 49 Oil sand production also results in emissions of carcinogenic PAHs and a variety of trace metals. 215 Unsurprisingly, areas near tar sand extraction sites have a high incidence of cancer. 216 The overall cancer rate at these locations is much greater than previously estimated, and has been linked to oil sands operations. 217 The increased cancer risk is likely due to high emissions of PAHs from oil sands production. 218

215 PAHs are complex chemicals built on three to five benzene rings. Kelly et al., supra note 212, SI at 1. EPA acknowledges PAHs to be probable

human carcinogens. Tier 3 Rule, 79 Fed Reg. at 23436. Indeed, some common PAHs are demonstrated carcinogens—benzo[a]pyrene (BaP), a common PAH found in petroleum-based gasoline, is a Group 1 carcinogen. See Benzo[a]pyrene, IARC Monograph, at 138, available at <http://bit.ly/1QllhZd>. See also Takeshi Ohura et al., Polycyclic Aromatic Hydrocarbons in Indoor and Outdoor Environments and Factors Affecting their Concentrations, 38 Environ. Sci. & Tech. 77 (2004). Naphthalene, another PAH found in gasoline, is believed to cause cancer and other toxic health effects. Tier 3 Rule, 79 Fed Reg. at 23436. According to California’s Office of Environmental Health Hazard Assessment (OEHHA), the “unit cancer risk” for PAHs—the risk that a certain dose will cause cancer over an individual’s lifetime, Final New Source Performance Standards and Amendments to the National Emissions Standards for Hazardous Air Pollutants for the Oil and Natural Gas Industry, Regulatory Impact Analysis, at 4-12 & n.36 (2012)—is approximately 407 times greater than the corresponding unit risk for acetaldehyde, 38 times greater than the unit risk for benzene, and about 184 times greater than the unit risk for formaldehyde. Stefan Unnasch & Ashley Henderson, Life Cycle Associates, Change in Air Quality Impacts Associated with the use of E15 Blends Instead of E10, LCA.6091.94.2014, at 11 (2014). In addition to being highly carcinogenic and mutagenic, PAHs have been linked to a host of negative health effects, including adverse birth outcomes, development delays, anxiety, depression, and attention deficit disorder, particularly in urban children exposed to high-levels of coal and vehicle exhaust. Tier 3 Rule, 79 Fed Reg. at 23436; Frederica P. Perera et al., Prenatal Polycyclic Aromatic Hydrocarbon (PAH) Exposure and Child Behavior at age 6-7, 120 Environ. Health Persp. 921 (2012). 216 Isobel J. Simpson et al., Air Quality in the Industrial Heartland of Alberta, Canada and Potential Impacts on Human Health, 81 Atmosph. Environ. 72 (2013). 217 Yiqun Chen, Alberta Health Services, Cancer Incidence in Fort Chipewyan, Alberta 1995–2006 (2009); see also Marty Klinkenberg, Oil Sands Pollution Linked to Higher Cancer Rates in Fort Chipewyan for First Time: Study, Financial Post (July 8, 2014). 218 Abha Parajulee & Fran Wania, Evaluating Officially Reported Polycyclic Aromatic Hydrocarbon Emissions in the Athabasca Oil Sands Region with a Multimedia Fate Model, 111 PNAS 3344 (2014); Kelly et al., *supra* note 212, at 22350 (“Due to substantial loadings of airborne PAC [polycyclic aromatic compounds], the oil sands industry is a far greater source of regional PAC contamination than previously realized”); *id.* at Supplemental Information 1. 50 Diluted bitumen (“dilbit”) and synthetic crude transportation to U.S. refineries also pose lifecycle risks to human health within the United States. Dilbit exports have doubled since 2008, up to 550,000 barrels per day, representing more than half of all tar sand oil imports into the United States. 219 Dilbit spills impose particularly heavy costs on society—a recent dilbit spill in Michigan has cleanup costs exceeding \$1 billion, 220 and has imposed significant health costs on society by releasing benzene and PAHs into the water and the ambient air. 221 2. Shale Oil Extraction Shale oil extraction is a source of many air pollutants that affect human health in the United States; in addition to benzene and other known toxics, the production of shale oil and gas involves heavy diesel vehicles and equipment that emit substantial ambient PM 2.5 . 222 Because on average, a fracking well requires “between 2 and 5 million gallons of water per hydraulic fracturing event . . . it has been estimated that approximately 2,300 trips by heavy-duty trucks are required for each horizontal well[.]” 223 Moreover, because shale wells are concentrated in particular 219 See National Research Council, National Academy of Sciences, Spills of Diluted Bitumen from Pipelines: A Comparative Study of Environmental Fate, Effects, and Response 9 (2015); Anthony Swift et al., NRDC, NWF, PST, Sierra Club, Tar Sands Pipelines Safety Risks 5 (Feb. 2011). 220 National Research Council, National Academy of Sciences, Spills of Diluted Bitumen from Pipelines: A Comparative Study of Environmental Fate, Effects, and Response 38 (2015). 221 Michigan Department of Community Health, Public Health Assessment, Kalamazoo River/Enbridge Spill, Final Report (2013), available at <http://1.usa.gov/1phxtXZ>. 222 See, e.g., Seth B. Shonkoff et al., Environmental Public Health Dimensions of Shale and Tight Gas Development, 122 Environ. Health Persp. 787 (2014); Anirban Roy, Air Pollutant Emissions from the Development, Production, and Processing of Marcellus Shale Natural Gas, 64 J. Air & Waste Mgmt. Ass’n 19 (2014). 223 Shonkoff et al., *supra* note 222, at 791. 51 “hot spots,” concentrated diesel PM 2.5 and benzene have increased the incidence of cancer and respiratory disease in those areas. 224 Shale oil extraction also emits significant amounts of PM 2.5 precursors and VOCs, which have worsened smog problems in Colorado and Utah. 225 Moreover, air measurement studies show that current emission inventories underestimate the emissions of benzene and VOCs from shale. 226 A recent study by the National Oceanic and Atmospheric Administration (NOAA) concludes that VOC emissions are underestimated by a factor of at least two and that benzene emissions are sevenfold higher than reported in Colorado’s inventory. 227 Furthermore, as the amount of pollution from petroleum extraction is

increasing, the domestic share of that pollution is increasing as well. Unlike conventional oil, which is largely produced in foreign countries, tight oil production occurs in the United States. 228 Conventional air pollutants are location-specific (unlike GHGs), so increased U.S. production of new petroleum sources has a profound adverse effect on domestic air quality. 224 *Id.* A NIOSH field investigation is currently investigating the risk posed by PM emissions of diesel exhaust to oil and gas workers and their families. See NIOSH, Field Effort to Assess Chemical Exposure Risk, Fact Sheet, available at <http://1.usa.gov/1UUkszm>; see also NIOSH, Oil & Gas Extraction, OSHA, available at <http://1.usa.gov/1LS2oUv>. 225 See Proposed Emission Standards for New and Modified Sources in the Oil and Natural Gas Sector, Regulatory Impact Analysis, at 4-19 (2015). 226 Gabrielle Pétron et al., A New Look at Methane and Non-Methane Hydrocarbon Emissions from Oil and Natural Gas Operations in the Colorado Denver-Julesburg Basin, 119 J. Geophys. Res. Atmospheres 6836 (2014) [hereinafter Pétron et al., Hydrocarbon Emissions from Oil and Natural Gas]; Gabrielle Pétron et al., Hydrocarbon Emissions Characterization in the Colorado Front Range: A Pilot Study, 117 J. Geophys. Res. 236 (2012). 227 Pétron et al., Hydrocarbon Emissions from Oil and Natural Gas, *supra* note 226. 228 See U.S. Energy Information Administration, Annual Energy Outlook, at D-14 to D-15 (2015) (predicting increased United States production of oil between 2013 and 2020). 52 EPA's 2010 Lifecycle Analysis does not account for the growing market share of "tight oil." EPA's analysis therefore excludes the higher emissions of PM 2.5 NO_x, SO_x, and other pollutants from oil sands and from shale oil production—a significant omission given that tar sands account for 10% of all crude processed by U.S. refineries (and are forecast to reach 13.6% by 2020), 229 and shale oil accounts for 50% of total United States oil production. 230 D. Fuel Production 1. Ethanol Biorefineries Corn ethanol biorefineries are a source of PM 2.5, both because they directly emit PM precursors, including volatile organic compounds VOCs, SO₂ and NO_x, and because they consume significant amounts of natural gas. 231 But, as with farming, the lifecycle PM emissions of corn ethanol production are falling: increased ethanol yields, new and higher co-product yields, and the use of combined heat and power and other improvements in biorefinery energy efficiency have reduced natural gas usage in ethanol plants, reducing emissions of PM 2.5 and its precursors. 232 Biorefineries also emit VOCs through a variety of processes, mostly through evaporative emissions of ethanol and acetaldehyde from boilers. 233 While these 229 Cai et al., *supra* note 146. 230 Marcelo Prince & Carlos A. Tovar, How Much U.S. Oil and Gas Comes From Fracking? Wall Street J. (Apr. 1, 2015), available at <http://on.wsj.com/1RSfTTn>. 231 Joost De Gouw et al., Airborne Measurements of the Atmospheric Emissions from a Fuel Ethanol Refinery, 120 J. Geo. Res: Atmosph. 4385, 4338 (2015). 232 See Mueller & Kwik, *supra* note 124, at 2-18; 2011 Report to Congress, *supra* note 7, at 4-5. 233 See Prevention of Significant Deterioration, Nonattainment New Source Review, and Title V: Treatment of Certain Ethanol Production Facilities Under the "Major Emitting Facility" 53 chemicals contribute to ozone, they are relatively non-toxic compared to the toxic hydrocarbons emitted during the lifecycle of gasoline. 234 Existing pollution control technologies are being implemented at a low cost to substantially reduce these biorefinery emissions. 235 It is therefore critical that lifecycle emissions estimates be based on representative technology. 236 Any analysis of biorefinery emissions must take into account the relatively low toxicity of ethanol and acetaldehyde emissions, compared with the VOCs emitted from gasoline refineries. And such an analysis must also consider the proximity of these facilities to humans. Because ethanol refineries are mostly colocated with corn fields in rural areas, they have lower impacts on human health per unit of pollution than gasoline refining, which occurs largely near urban areas. 237 2. Petroleum Refineries Petroleum refineries are a significant source of urban pollution, including PM 2.5 and other air toxics like benzene. Unlike biorefineries, crude oil refineries are Definition, 72 Fed. Reg. 24060, 24070 (May 1, 2007); see also Cook et al., *supra* note 195, at 7715 ("VOCs emitted in the largest quantity from ethanol plants include formaldehyde and acetaldehyde"). 234 Unlike ethanol and acetaldehyde, which typically cause eye irritation, refineries emit substantial amounts of benzene, a known carcinogen. See Final New Source Performance Standards and Amendments to the National Emissions Standards for Hazardous Air Pollutants for the Oil and Natural Gas Industry, at 4-14 (Apr. 2012). 235 Dan Despen, Accurate VOC, HAP Measurement Critical for Permit Compliance, Ethanol Producer Magazine (Oct. 15, 2014), available at <http://bit.ly/1p9tr3g>. 236 Studies of outdated technology will report outdated results. For example, NOAA air measurements of an ethanol plant suggested that VOC emissions from ethanol plants might be greater than EPA estimates. In particular, NOAA's air measurements suggested that refinery emissions of ethanol and acetaldehyde are underestimated by current inventories. De Gouw et al., *supra* note 231. But NOAA scientists took their air measurements from a single unrepresentative plant

in Decatur, Illinois—one of the few remaining coal-powered wet-mill ethanol refineries left in the country. Id. at 4390. Further studies are needed to determine the accuracy of current inventories. 237 See *infra* note 238. 54 located near urban populations. 238 According to EPA, more than 6.1 million people live within three miles of a petroleum refinery—disproportionately low-income minorities and vulnerable community groups. 239 In addition to being subjected to dangerous amounts of benzene and PAHs, petroleum processing and fossil fuel combustion from refineries subject these residents to significant quantities of PM 2.5 and PM 2.5 precursors like SO₂—up to 247,000 tons of SO₂ and 30,000 tons of direct PM 2.5 per year. 240 Refinery emissions of xylene and other hydrocarbons also contribute to ozone. 241 Refineries pollute more today than in the past because of the source of the petroleum. Tar sands products increase refinery emissions: dilbit and synthetic crude contain higher amounts of benzene and heavy metals, which evaporate during the 238 See Hill et al., *supra* note 190, at 2078; Christopher W. Tessum et al., A Spatially and Temporally Explicit Life Cycle Inventory of Air Pollutants from Gasoline and Ethanol in the United States, 46 *Environ. Sci. & Tech.* 11408, at Supplemental Information 2-1 (2012) (finding that 80% of refineries are near population centers, compared to only 10% of biorefineries). The Tessum study omits Canadian refinery emissions, which contribute to cross-border pollution in the United States. See, e.g., Canada-United States Air Quality Agreement Progress Report (2012) (stating that the petroleum industry accounts for 21% of all Canadian NO_x), available at <http://bit.ly/1M83Ywe>; see also Natural Resources Canada, Canadian Refineries Government of Canada (location of Canadian refineries), at <http://bit.ly/1RSdBU5>. 239 EPA, Final Petroleum Refinery Sector Risk and Technology Review and New Source Performance Overview, Fact Sheet, available at <http://1.usa.gov/1R8suPi>. 240 See EPA, Addressing Air Emissions from the Petroleum Refinery Sector, Public Outreach Presentation, Office of Air Quality Planning and Standards 3 (2011), available at <http://1.usa.gov/1RB11WX>. These numbers remain high despite the fact that gasoline refineries have been subjected to EPA and state enforcement for decades. See James H. Wilson Jr. & Maureen A. Mullen, Including the Emission Effects of Refinery Cases and Settlements in Projections for the EPA's CAAA Section 812 Analysis (2015), available at <http://1.usa.gov/1TNjExm>. 241 See William P.L. Carter, Updated Maximum Incremental Reactivity Scale and Hydrocarbon Bin Reactivities for Regulatory Applications (Jun. 22, 2009), available at <http://bit.ly/1U4vNxq>. 55 refining process. They are also harder to break down into light gasoline products, increasing VOC emissions and ozone. 242 E. Tailpipe Emissions Unlike upstream air toxic emissions from producing ethanol, which affect air quality of areas primarily in the rural Midwest, tailpipe emissions are ubiquitous and disproportionately affect densely populated urban areas. Mobile sources are responsible for approximately “47 percent of outdoor toxic emissions, over 50 percent of the cancer risk, and over 80 percent of the noncancer hazard.” 243 Blending ethanol into gasoline reduces air pollution from motor vehicles, improving the lifecycle health effects of ethanol. But EPA relied on outdated, flawed studies to support contrary conclusions in its 2010 Lifecycle Analysis and 2011 Report to Congress. By underestimating the tailpipe benefits of existing ethanol blends, EPA systematically underestimated the air quality benefits of corn ethanol. Moreover, by ignoring future mid-level ethanol blends, EPA ignored the lifecycle benefits that can be achieved in a high-ethanol, high-octane future. In its 2010 Lifecycle Analysis, EPA correctly stated that for E10 “most studies show reductions in emissions of . . . benzene, and 1,3-butadiene[.]” 244 However, according to EPA, “data . . . are more equivocal for NO_x and VOC.” 245 Based on 242 NRDC, Tar Sands Crude Oil: Health Effects of a Dirty and Destructive Fuel 5 (Feb. 2014), available at <http://on.nrdc.org/1A6w1Y1>. 243 2010 RFS RIA, *supra* note 1, at 604. 244 Cook et al., *supra* note 195, at 7715. 245 Id. 56 “limited data,” EPA assumed that E10 decreased VOC emission rates by 7% to 10%, but increased NO_x by over 7%. 246 In fact, E10 reduces NO_x. To reach its unsupported conclusion with respect to NO_x, EPA’s 2010 Lifecycle Analysis extended the results of the “so-called ‘Predictive Model,’” developed more than 16 years ago to assess California’s request for an oxygenate waiver in Tier 0 vehicles, and used test data from trade groups including Exxon Mobil and the Mexican Petroleum Institute. 247 Even though the Agency admitted that “there was not enough consistency across these studies to confidently predict the impact of oxygenated fuel on . . . NO_x emissions,” 248 EPA irrationally extended its NO_x results to Tier 1 vehicles, based on a single flawed study published by the Coordinating Research Council, which was designed to model the effect of oxygen and RVP on carbon monoxide, not NO_x. 249 Moreover, EPA found that the data did not justify extending the results to Tier 2 vehicles. 250 Subsequent, peer reviewed studies by EPA, however, state without qualification that “E10 was assumed to . . . increase NO_x emissions by over 7%.” 251 This information fundamentally misinforms 246 Id. at 7716. 247 2010 RFS RIA, *supra* note 1, at 604. 248

Id. at 507. 249 Id. at 507–08. (“[I]n our analysis for this final rule, we extended these effects to Tier 1 and NLEV cars and light trucks (through the 2003 model year) based on a recently published study from CRC.) (citing Coordinating Research Council, Effects of Vapor Pressure, Oxygen Content, and Temperature on CO Exhaust Emissions, CRC Report E-74b (2009) [hereinafter CRC Report E-74b], available at <http://bit.ly/1S3F2II>). The CRC E-74b program “was designed primarily to evaluate the effects of RVP and oxygenate content on exhaust CO emissions under conditions similar to those found in the Phoenix and Las Vegas areas during the winter on recent model-year vehicles.” CRC Report E-74B, at 1. The study only incidentally reported NO X emission effects. Id. at 5. Moreover, the methodology used in the study, which match-blended T50 for ethanol-gasoline blends, is questionable and unnecessary. See Anderson et al., *supra* note 163. 250 Id. at 508. 251 Cook et al., *supra* note 170, at 7716. 57 the public as to the nature of EPA’s lifecycle findings with respect to tailpipe NO X emissions, and should be corrected. 252 More fundamentally, EPA’s 2010 Lifecycle Analysis failed to fully account for the toxic effects of PM from aromatics, which ethanol reduces, and failed to account for the risk of aromatics when compared to other, less harmful toxics associated with ethanol. As discussed below, new evidence shows that blending ethanol into gasoline reduces or at least has no effect on most pollutants, with the exception of acetaldehyde, which is a relatively non-toxic irritant. Thus, the lifecycle air quality benefits of ethanol are much greater than EPA assumed in 2010. 1. Benzene, Toluene, Ethylbenzene, and Xylene (BTEX) Benzene, toluene, ethylbenzene, and xylene (collectively, BTEX), are the main aromatic hydrocarbons currently added by refiners to gasoline boost fuel “octane.” 253 BTEX are emitted directly from the tailpipe and have carcinogenic and mutagenic effects. 254 In addition, BTEX are an important source of secondary PM formation and ozone. 255 Recent evidence suggests that BTEX exposure has negative health effects at much lower concentrations than EPA has deemed safe. 256

252 While EPA did not adopt all of its conclusions, EPA relied on a low-emitter study by Environment Canada concluding that E10 produced “higher emissions of other pollution species such as non-methane hydrocarbons (NMHCs), non-methane organic gas, acetaldehyde, benzene, and 1,3butadiene.” NAS Report, *supra* note 49, at 203 (citing Lisa A. Graham, Emissions from Light Duty Gasoline Vehicles Operating on Low Blend Ethanol Gasoline and E85, 42 Atmosph. Environ. 4498–4516 (2008)). This study is also incorrect. 253 Benzene, toluene, ethylbenzene, and xylene were designated as Hazardous Air Pollutants by the 1990 Amendments to the Clean Air Act. See 42 U.S.C. § 7412(b)(1). 254 Ashley L. Bolden et al., New Look at BTEX: Are Ambient Levels a Problem?, 49 Environ. Sci. & Tech. 5261, 5261 (2015). 255 See Katherine Von Stackelberg et al., Public Health Impacts of Secondary Particulate Formation from Aromatic Hydrocarbons in Gasoline, 12 Environ. Health 1, 1–2 (2013). 256 Bolden et al., *supra* note 254, at 5270. 58 A Health Effects Institute study recently concluded that “gasoline-powered vehicles are the main sources of VOCs (including BTEX) at the near-road sites.” 257 In particular, gasoline exhaust is the source of between 70% to 100% of on- and nearroad concentrations of VOCs, and the source of substantially all on- and near-road concentrations of BTEX. 258 Because ethanol is a source of fuel octane, it reduces the need to add BTEX aromatics to the gasoline blendstock. EPA estimates that due to E10, the average aromatics content in summer gasoline has fallen by 4% to 5%, to about 24% to 25% of the total volume. 259 Ethanol naturally reduces BTEX emissions because ethanol is a simple molecule that contains no aromatic hydrocarbons. 260 New evidence from recent fuel studies overwhelmingly shows that blending ethanol into gasoline results in significant decreases in BTEX pollution. One vehicle study modeling fuel with different aromatic contents in both GDI and port fueled injection (PFI) engines recently concluded that raising the level of aromatics from 25% to 35% raises BTEX emissions by between 81% and 194%—and that further reducing aromatics delivers even larger BTEX reduction benefits. 261

257 Eric Fujita, Concentrations of Air Toxics in Motor Vehicle Dominated Environments, Health Effects Inst., Research Report No. 156, at 2 (Feb. 2011); see also Von Stackelberg, *supra* note 255, at 5 (“Source-specific speciation of total VOC in the 2005 National Emissions Inventory reveals that the U.S. emissions of single-ring aromatic hydrocarbons are 3.6 million tons per year, of which 69% are from gasoline-powered vehicles”). 258 Fujita, *supra* note 257, at 2 (“Apportionment of BTEX showed that gasoline was the dominant source (94% to 100%) for all on-road samples”). 259 Control of Air Pollution from Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards Final Rule, Regulatory Impact Analysis, at 3-5 (2014) [hereinafter Tier 3 RIA]; see also, Bolden et al., *supra* note 254, at 5261 (noting that recent studies show that in 1998, before ethanol was blended into gasoline, “BTEX collectively comprised as much as 27.5% of high octane at the pump”). 260 Aikawa et al., *supra* note 163, at 610–11. 261 Georgios Karavalakis et al., Evaluating the Effects of Aromatics Content in Gasoline on Gaseous and Particulate Matter Emissions from SI-PFI and SIDI

Vehicles, 49 Environ. Sci. & Tech. 7021, 7026 59 2. Particulate Matter (PM) Gasoline exhaust is a “ubiquitous source of particulate matter.” 262 While EPA has historically associated PM 2.5 emissions with diesel engines, “recent studies report that a substantial amount of PM emissions are produced not only by diesel engines, but by gasoline engines as well.” 263 Moreover, direct injection technology is expected to dramatically increase the number and mass of fine (and particularly dangerous ultra-fine) PM emissions from motor vehicles. 264 Blending ethanol into gasoline reduces PM emissions, in terms of both mass and particle number. 265 This is mainly because ethanol displaces aromatics, which are responsible for most of the PM emissions from fuel combustion. 266 Depending on the engine calibration, E10 can reduce PM mass emissions by up to 20% in new GDI (2015). Raising the aromatics level from 15% to 35% raises BTEX emission by between 107% and 376%. Id. 262 Tier 3 Rule, 79 Fed Reg. at 8440. 263 See Aikawa et al., *supra* note 163, at 617; Manufacturers of Emission Controls Association, *Ultrafine Particulate Matter and the Benefits of Reducing Particle Number in the United States*, available at <http://bit.ly/1RB1kks>. 264 Id. In GDI engines, fuel particles attach to (or impinge on) cylinders and pistons, preventing fuel from fully vaporizing and mixing with air during combustion, thereby increasing particle emissions. See Georgios Karavalakis et al., *Assessing the Impacts of Ethanol and Isobutanol on Gaseous and Particulate Emissions from Flex-Fuel Vehicles*, 48 Environ. Sci. Technol. 14016, 14021 (2014). For a discussion of the dangers of ultrafine particles, see A.B. Knol et al., *Expert Elicitation on Ultrafine Particles: Likelihood of Health Effects and Causal Pathways*, 6 Particle Fibre Toxicol. at 2 (2009); EPA Integrated Science Assessment for Particulate Matter, at 5-3 & n.34 (2009) (“[T]he greater surface per unit volume of UFPs could potentially deliver relatively more adsorbed soluble components to cells,” and “may have more opportunity to interact with cell surfaces.”). 265 Anderson et al., *supra* note 163, at 1031. 266 Karavalakis et al., *supra* note 264, at 7027. Honda scientists have shown that PM is correlated with high-boiling, aromatic hydrocarbons in an empirical model. Aikawa et al., *supra* note 163. 60 engines, as compared to E0. 267 Higher ethanol blends reduce PM even more. 268 A recent study shows dramatic reductions in PM mass and number from transitioning to E83 in both GDI and PFI engines. 269 3. Secondary Organic Aerosol (SOA) Secondary Organic Aerosol (SOA), a species of secondary PM 2.5, is one of the major contributors to the PM 2.5 burden in the United States, and it causes a range of negative health effects. 270 Vehicle emissions represent the largest source of anthropogenic urban SOAs. 271 A growing body of scientific evidence shows that the entire SOA formation potential of gasoline is attributable to the aromatic hydrocarbons added to enhance fuel octane. 272 And recent EPA studies confirm that ethanol does not contribute to SOA. 273 267 Maricq et al., *supra* note 170, at 580. 268 Id. at 581 (PM “decreases slightly from 0% to 17% ethanol, but falls by 45% for E32 and E45.”). 269 Karavalakis et al., *supra* note 264, at 14021. 270 See Von Stackelberg et al., *supra* note 255, at 7-8; Lynn M. Russell et al., *Secondary Organic Aerosol Formation from Fossil Fuel Sources Contribute Majority of Summertime Organic Mass at Bakersfield*, available at <http://bit.ly/1phxwTE>. 271 R. Bahreini et al., *Gasoline Emissions Dominate over Diesel in Formation of Secondary Organic Aerosol Mass*, 39 Geophys. Res. Lett. L06805 (2012); Michael J. Kleeman et al., *Source Apportionment of Secondary Organic Aerosol During a Severe Photochemical Smog Episode*, 41 Atmos. Environ. 576 (2007). 272 Von Stackelberg et al., *supra* note 255, at 2; see also id. (“[E]vidence is growing that aromatics in gasoline exhaust are among the most efficient secondary organic matter precursors.”); L. Hildebrandt et al., *High Formation of Secondary Organic Aerosol from the Photo-Oxidation of Toluene*, 9 Atmos. Chem. & Phys. 2973 (2009); Odum et al, *supra* note 164, at 96. 273 2010 RFS RIA, *supra* note 1, at 575–81. EPA is currently conducting further studies on SOA. See Sherri Hunt, *Research Partnership Advancing the Science of Organic Aerosols* (June 19, 2013), available at <http://1.usa.gov/1U4vYc7>. 61 The health impacts of SOA formation from aromatics are dramatic: The Harvard study estimates that SOA carries a social cost of up to \$34.9 billion a year. 274 To put this number in perspective, EPA estimated the 2010 RFS Rule’s total monetized social costs of ozone and particulate matter at \$630 million to \$2.2 billion. 275 While EPA’s vehicular pollution controls reduce other primary pollutants, they do not significantly reduce SOA precursors. 276 However, the SOA-forming potential of gasoline—and the associated PM 2.5 burden—can be substantially reduced by substituting aromatic hydrocarbons with ethanol. As EPA has recognized, “[d]ue to the high octane quality of ethanol, it greatly reduces the need for . . . aromatics including toluene.” 277 EPA’s 2010 Lifecycle Analysis fails to account for these benefits, because EPA’s widely used CMAQ model vastly underestimates the SOA-forming potential of gasoline—by a factor of at least 3.8. 278 274 Von Stackelberg et al., *supra* note 255, at 6; Neal Fann et al., *The Influence of Location, Source, and Emission Type in Estimates of the Human Health*

Benefits of Reducing a Ton of Air Pollution, 2 Air Qual. Atmos. Health 169 (2009). 275 *Id.* at 5. 276 T.D. Gordon et al., Secondary Organic Aerosol Formation Exceeds Primary Particulate Matter Emissions for Light Duty Gasoline Vehicles, 13 Atmos. Chem. Phys. Discuss. 23173, 23176, 23197 (2013) (finding that even though the contribution of light duty vehicle emissions to ambient PM levels is “dominated” by secondary SOA and nitrates, “catalysts are optimized to reduce emissions of regulated pollutants (NO X , NMOG, and CO), not SOA precursors.”). 277 2010 RFS RIA, *supra* note 1, at 579. EPA’s own model also predicts that SOA from biogenic sources could be reduced by as much as 50% though reduction in anthropogenic sources of pollution, including mobile PM. Annmarie G. Carlton et al., To What Extent Can Biogenic SOA Be Controlled?, 44 Environ. Sci. Technol. 3376 (2010). 278 Von Stackelberg et al., *supra* note 255, at 3. 62 4. Polycyclic Aromatic Hydrocarbons (PAHs) The high-molecular weight PAHs present in gasoline are particularly dangerous to human health because they bond with ultra-fine particles and directly enter the bloodstream. 279 According to EPA, “the majority of PAHs are adsorbed onto particles less than 1 [micrometer] in diameter.” 280 SOAs coat and protect PAHs, turning them into long-range pollutants. 281 Gasoline particles are also a major source of PAH deposition in water, which has “increased by 200% to 300% over the last forty years and correlates with increased vehicle use.” 282 Motor vehicle emissions are estimated to account for 46% to 90% of outdoor PAHs in urban areas. 283 PAHs are emitted through vehicle tailpipes in either gas or particle form, as a result of the incomplete combustion of the aromatic fraction of gasoline. 284 Because PAHs combust only at very high temperatures, they significantly increase the PM burden in urban and heavy-traffic areas. 285 Indeed, fuel studies have 279 See Yuling Jia et al., Estimated Reduction in Cancer Risk due to PAH Exposures If Source Control Measures during the 2008 Beijing Olympics Were Sustained, 119 Environ. Health Perspect. 815, 820 (2011). 280 Tier 3 RIA, *supra* note 259, at 6-25 (2014). 281 A. Zelenyuk et al., Synergy Between Secondary Organic Aerosols and Long-Range Transport of Polycyclic Aromatic Hydrocarbons, 46 Environ. Sci. Technol. 12459 (2012). 282 Tier 3 RIA, *supra*, note 259, at 6-25. 283 Cathryn C. Tonne et al., Predictors of personal polycyclic aromatic hydrocarbon exposures among pregnant minority women in New York City, 112 Environ. Health Perspect. 754 (2004); see also Tier 3 RIA, *supra*, note 259, at 6-25 (“Major sources of PAHs include mobile sources.”) 284 Karavalakis et al., *supra* note 261, at 7021, 7027 (“Aromatic hydrocarbons are unsaturated compounds with a benzene ring-like structure and are known to form polycyclic aromatic hydrocarbons (PAHs), which are precursors of soot particles Aromatic compounds can act as seed molecules for molecular growth and polymerization to form larger hydrogen-deficient molecules (PAHs) that produce soot.”); see also Tier 3 RIA, *supra*, note 259, at 6-25. 285 Karavalakis et al., *supra* note 261, at 7027. 63 shown that PM emissions from gasoline-powered vehicles are overwhelmingly made up of PAHs. 286 Blending ethanol to displace octane-enhancing aromatics has been shown to reduce PAH emissions—one recent study find that E10 reduces PAH emissions by approximately 70%, and that E85 reduces PAHs by 85%, relative to E0. 287 EPA’s 2010 Lifecycle Analysis fails to account for this reduction because it does not account for PAH emissions at all. 5. Nitrogen Oxide (NO X) EPA’s 2010 assessment of the lifecycle emissions effects of the RFS was wrong to assume E10 increased NO X emissions. 288 EPA’s own scientists have noted that ethanol decreases NO X in modern vehicles equipped with oxygen sensors that can control and calibrate air-fuel ratios. 289 The effect of ethanol on NO X emissions depends on engine calibration: In vehicles with oxygen sensors, the effect of E10 on NO X emissions is not significant—indeed, studies show that NO X actually decreases 286 Aikawa et al., *supra* note 163, at 610, 611 (“PN increased in a majority of gasoline blends to which hydrocarbons had been added. Partly because only hydrocarbons were added to the gasoline, . . . all of the additional PN is considered a PAH (polycyclic aromatic hydrocarbon) with a high boiling point or soot. The higher the boiling point hydrocarbon added, the more the PN increases. This trend is particularly notable with aromatic substances.”). 287 M.A. Costagliola et al., Combustion Efficiency and Engine Out Emissions of a S.I. Engine Fueled with Alcohol/Gasoline Blends, Applied Energy 1, 9 & fig. 17 (2012) (finding “reduction of toxic equivalents [of the carcinogenic PAH benzo(a)pyrene (B(a)p)] when moving from gasoline to alcohol blends,” including a 60% to 70% reduction for splash blended E10, E20, and E30 as compared to gasoline, with even better results for E85); see also Dabrina D. Dutcher et al., Emissions from Ethanol/Gasoline Blends: A Single Particle Perspective, 2 Atmosphere 195 (2011). 288 Cf. 2010 RFS RIA, *supra* note 1, at 508 (assuming a NO X increase of over 7% in Tier 2 and earlier vehicles). 289 See Mathew Brusstar (EPA) & Marco Bakenhaus, Economical High-Efficiency Engine Technologies for Alcohol Fuels (Presented at ISAF XV International Symposium on Alcohol Fuels, Sep. 28, 2005), <http://1.usa.gov/1XeaEil>. 64 when a properly calibrated modern vehicle transitions from E0 to

E10. 290 This is probably due to the fact that ethanol displaces heavy aromatics which tend to form chamber deposits, increasing NO X tailpipe emissions. 291 6. Volatile Organic Compounds Some studies that associated ethanol tailpipe emissions with increased ozone do so in part because of VOC evaporative emissions from adding ethanol, because adding small amounts of ethanol to fuel results in an increase in the volatility of the fuel, as measured by Reid Vapor Pressure (RVP). 292 The attribution of this effect to ethanol is arbitrary, however; the increase in the RVP is due to the azeotropic behavior of ethanol in combination with aromatics. 293 The chemical effect could just as well be attributed to aromatics. 294 More importantly, increasing ethanol content above 10% reduces the RVP of the fuel, lowering VOC emissions. 295 290 Carolyn Hubbard et al., *Ethanol and Air Quality: Influence of Fuel Ethanol Content on Emissions and Fuel Economy of Flexible Fuel Vehicles*, 48 *Environ. Sci. & Tech.* 861, 861 (2014); Maricq et al., *supra* note 170, at 580 (finding decreases in NO X emissions of “about 20%” when the ethanol content of fuel is increased from 0% to 17% or higher). 291 See Health Effects Institute, *Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects* 3 (2010). 292 See, e.g., NAS Report, *supra* note 49, at 203 (citing National Research Council, National Academy of Sciences, *Ozone-Forming Potential of Reformulated Gasoline* (1999); Mark Z. Jacobson, *Effects of Ethanol (E85) Versus Gasoline Vehicles on Cancer and Mortality in the United States*, 2 *Environ. Sci. & Tech.* 148 (2009). 293 Anderson et al., *supra* note 163, at 1029–30. 294 *Id.* 295 *Id.*; Karavalakis et al., *supra* note 264, at 14021. 65 F. Future Fuels Blending ethanol into gasoline has reduced air pollution by displacing aromatics. However, recent evidence shows that transitioning from a blend of E10 to a mid-level blend of approximately 30% ethanol (E30) would further reduce pollutant tailpipe and evaporative emissions. Many studies have established that mid-level ethanol blends would reduce PM mass and number, 296 BTEX, 297 NO X , 298 and other pollutants to an even greater extent than E10. 299 Additionally, blending a higher volume of ethanol into gasoline would reduce the RVP of the fuel mixture, which would reduce evaporative emissions. 300 In addition to lowering fuel consumption and reducing GHG emissions, mid-level ethanol blends could provide a smooth transition to cleaner fuels, significantly advancing the Clean Air Act’s overarching goal of promoting the “public health and welfare and the productive capacity of the population.” 301 In sum, the weight of the evidence shows that transitioning to mid-level ethanol blends would dramatically reduce tailpipe emissions of aromatics, particle 296 Karavalakis et al., *supra* note 264, at 14021; Costagliola et al., *supra* note 287, at 9; Maricq et al., *supra* note 170, at 580. 297 See, e.g., Karavalakis et al., *supra* note 264, at 14020 (“Benzene emissions for E83 showed statistically significant decreases of 60% and 58%, respectively, relative to E10 and E51. For toluene, ethylbenzene, m/p-xylene, and o-xylene compounds as a group, the statistically significant reductions in emissions ranged from 66% to 85% for E83 compared to E10, from 66% to 84% for E83 compared to E51”); Costagliola et al., *supra* note 287, at 9; Maricq et al., *supra* note 170, at 580. 298 Hubbard et al., *supra* note 290. 299 E15 also reduces butadiene and formaldehyde relative to E10, despite recent EPA model predictions to the contrary. Anderson et al., *supra* note 163, at 1034. E15 is difficult to commercialize because EPA has chosen to deny the one-pound RVP waiver for E15 fuels. See Jeremy P. Greenhouse, *E15: Cracking the RVP Nut: New Blend Won’t Qualify for One Pound Waiver, Presenting Huge Hurdle*, *Ethanol Producer Mag.* (Oct. 18, 2011). 300 Anderson et al., *supra* note 163, at 1029–30; Stein et al., *supra* note 168. 301 42 U.S.C. § 7401(a)-(b). 66 mass and number, NO X , VOCs, and ozone. But EPA’s 2010 Lifecycle Analysis and its 2011 Report to Congress entirely fail to account for the benefits of mid-level blends. 302 By continuing to disseminate this short-sighted information, EPA fails to present information “in an accurate, clear, complete, and unbiased manner” as the Information Quality Guidelines require. 303 1. BTEX BTEX would be reduced through the use of mid-level biofuel blends. The University of California has shown that a fuel blend of 51% ethanol (E51) reduces benzene, toluene, and xylene relative to E10, and the reductions are greater in even higher ethanol blends. 304 This is particularly important because, BTEX are highly carcinogenic, 305 and because they contribute to ozone and SOA. 306 BTEX emissions are correlated with aromatics content, so replacing aromatics with ethanol reduces BTEX emission. 307 Raising total aromatics content from 15% to 25% raises BTEX emissions by about 52% to 103%. 308 302 EPA curtly discussed infrastructure issues related to the deployment of EPA, but EPA consciously disregarded evidence of the pollution benefits of mid-level blends in light of a pending application for an E15 waiver. See 2010 RFS RIA, *supra* note 1, at 256–57. 303 Information Quality Guidelines, *supra* note 14, at 14. 304 Georgios Karavalakis et al., *Assessing the Impacts of Ethanol and Isobutanol on Gaseous and Particulate Emissions from Flexible Fuel Vehicles*, 48 *Envtl. Sci. & Technol.* 14016, 14021 (2014). 305 See *supra* note 254 & accompanying text. 306 See *supra* note 255 & accompanying text. 307 E15,

which is currently legal but practically unavailable, reduces benzene emissions. Anderson et al., *supra* note 163, at 1034. 308 Karavalakis et al., *supra* note 261, at 7027. See also Stein et al., *supra* note 168. 67 2. PM and PN Mid-level ethanol blends would facilitate dramatic reductions in PM tailpipe emissions. In general, ethanol reduces PM because it replaces aromatic hydrocarbons with high double bond equivalent (DBE) values which “disproportionately contribute to PM formation.” 309 But ethanol also tends to reduce PM for two additional reasons: first, ethanol’s relatively high vapor pressure and low boiling point (78°C), allow it to reduce the boiling point of the fuel mixture, improving combustion; second, ethanol’s higher oxygen content helps it to promote leaner combustion and avoids the impingement of soot in GDI engines. 310 Numerous studies confirm that in both GDI and port fuel injection (PFI) engines, mid-level ethanol blends reduce PM mass and particle number (PN) emissions. 311 A recent University of California study found that E51 reduced PM mass emissions by 61% and reduced PN emission by 50%, relative to E10. 312 The study attributed these emissions reductions to “the increased oxygen content of the fuel which facilitates more complete combustion, or the lower hydrocarbon content.” 313 Many other studies corroborate these predictions. Oak Ridge Laboratory studies conducted in 2010 and 2012 show that E20 reduces average PM and PN 309 Stein et al., *supra* note 168, at 11. Double bond equivalent value, or DBE, is a measure of the number of double bonds and rings in the fuel molecule, defined as the number of hydrogen atoms which would be required to fully saturate the molecule. Id. 310 Id. 311 Anderson et al., *supra* note 163, at 1031 (collecting studies). 312 Karavalakis et al., *supra* note 304, at 14021, 14022. 313 Id. at 14021. 68 relative to E10 and E0. 314 A more recent Oak Ridge study confirms that E30 also reduces PM and PN. 315 Another recent study found that transitioning to higher ethanol blends could cut PN emissions in half. 316 A Ford Motor Company study of GDI engines also found that raising ethanol content to about 30% lowers PM and PN by 30% to 40%. 317 In another study, raising aromatics content from 15% to current levels of 25% was found to raise PM mass emissions by 148%. 318 3. NO X , VOCs, and Ozone Mid-level ethanol blends would also reduce emissions of NO X and organic compounds that contribute to ozone. The 2014 Ford study found that non-methane organic gases (NMOG) and total hydrocarbon emissions “exhibit a clear minimum around E20-E40,” lowering emissions from a flex-fuel vehicle by 25% and 35% relative to E0 and E80. 319 Moreover, in modern vehicles calibrated to sense the higher oxygen content of ethanol, “emissions of NO X decreased by approximately 70% as the ethanol content increased from E0 to E20-E40.” 320 As the Ford study concludes, the emissions results of mid-level ethanol blends “point to future opportunities for emission reductions of [ozone] from FFVs.” 321 EPA’s 2010 314 John M. Storey et al., Exhaust Particle Characterization for Lean and Stoichiometric DI Vehicles Operating on Ethanol-Gasoline Blends, SAE Tech. Paper (2012); John M. Storey et al., Ethanol Blend Effects On Direct Injection Spark-Ignition Gasoline Vehicle Particulate Matter Emissions, 3 SAE Int. J. Fuels Lubr. 650 (2010). 315 John M. Storey et al., Novel Characterization of GDI Engine Exhaust for Gasoline and Mid-Level Gasoline Alcohol Blends, 7 SAE Int. J. Fuels Lubr. 571 (2014). 316 Costagliola et al., *supra* note 287, at 6. 317 Maricq et al., *supra* note 170. 318 Karavalakis et al., *supra* note 261, at 7027. 319 Hubbard et al., *supra* note 290, at C. 320 Id. at E. 321 Id. at F. This is consistent with other studies. For example, a 2010 Honda study testing emissions in a GDI light-duty vehicle found that E45 reduced NO X and hydrocarbon emissions by 20%. Maricq et al., *supra* note 170, at 580. 69 Lifecycle Analysis and 2011 Report to Congress presents incomplete information by neglecting the added benefits of mid-level ethanol blends. CONCLUSION A lifecycle analysis used by the primary environmental regulator and submissions to Congress should reflect the most up-to-date scientific research. The data and studies that were available to EPA in 2010 were inaccurate, and they are now obsolete. A careful analysis of the best available science at every stage in the lifecycles of gasoline and ethanol clearly establishes the emissions reductions that ethanol has already achieved, and the even more substantial reductions that it can achieve in the future. The social benefits of ethanol are great. Even though EPA grossly underestimated ethanol’s emissions reduction potential, the Agency still found in 2010 that blending ethanol into gasoline reduces lifecycle GHG emissions, and that the monetized annual benefits of the RFS’s GHG reduction (\$600 million to \$12.2 billion, depending on the social cost of carbon 322) exceed the relatively small air quality costs that EPA predicted from ethanol’s effect on conventional air pollution (\$630 million to \$2.2 billion 323). But ethanol’s benefits are even greater than EPA predicted in 2010. The best available science demonstrates that ethanol’s carbon intensity is significantly lower (36.62g or less instead of 74.81g CO₂ e/MJ) and gasoline’s significantly higher (96.89g instead of 93.01g CO₂ e/MJ) than EPA predicted. 324 322 2010 RFS RIA, *supra* note 1, at 6 (estimate for 2022, the first year in which the RFS would be fully phased in). 323 Id. 324 See *supra* p.

42. 70 By the same token, air pollution costs associated with ethanol production are easily overwhelmed by ethanol's air quality benefits in light of the toxic aromatics that ethanol displaces, innovations in corn agriculture and ethanol production, and increasingly dirty gasoline extracted in the United States. 325 Consistent with its Information Quality Guidelines, EPA must correct the inaccuracies reflected in its 2010 Lifecycle Analysis and its 2011 Report to Congress to reflect the best available science.

325 See supra pp. 41–63. 71 APPENDIX I GREET 1 2015 Land Use Change for Corn Ethanol Default Values: Corn Ethanol 2011 Case, Conventional Till, 8.3) CO 2 Emission Estimates from Land Use Changes and Land Management Changes of Farming: grams/gal of ethanol 8.3.a) Land Use Change Scenario Options Select Corn Ethanol Case Corn Ethanol 2011 Select Domestic Emissions Modeling Scenario Century Select International Emissions Modeling Scenario Winrock Domestic Emissions Modeling Scenario yield_increase Soil depth considered in modeling 100 cm Harvested Wood Product (HWP) Scenario HEATH Land Management Practice for Corn and Corn Stover Production Conventional Till Forest Prorating Factor Yes 8.3.c) CO 2 Emissions from Potential Land Use Changes of Farming: grams/gal of Ethanol Corn Inclusion of CO 2 Emissions from Land Use Change 2 Domestic (Data Cell) 212 Foreign (Data Cell) 399 Domestic (Grams/Mj) 2.64 Foreign (Grams/Mj) 4.95 Total LUC (Grams/Mj) 7.59 72 Scenario 1 – Use Corn Ethanol 2013 Case 8.3) CO 2 Emission Estimates from Land Use Changes and Land Management Changes of Farming: grams/gal of ethanol 8.3.a) Land Use Change Scenario Options Select Corn Ethanol Case Corn Ethanol 2013 Select Domestic Emissions Modeling Scenario Century Select International Emissions Modeling Scenario Winrock Domestic Emissions Modeling Scenario yield_increase Soil depth considered in modeling 100 cm Harvested Wood Product (HWP) Scenario HEATH Land Management Practice for Corn and Corn Stover Production Conventional Till Forest Prorating Factor Yes 8.3.c) CO 2 Emissions from Potential Land Use Changes of Farming: grams/gal of Ethanol Corn Inclusion of CO 2 Emissions from Land Use Change 2 Domestic (Data Cell) -156 Foreign (Data Cell) 413 Domestic (Grams/Mj) -1.93 Foreign (Grams/Mj) 5.12 Total LUC (Grams/Mj) 3.19 73 Scenario 2 – Corn Ethanol 2013, Reduced Till 8.3) CO 2 Emission Estimates from Land Use Changes and Land Management Changes of Farming: grams/gal of ethanol 8.3.a) Land Use Change Scenario Options Select Corn Ethanol Case Corn Ethanol 2013 Select Domestic Emissions Modeling Scenario Century Select International Emissions Modeling Scenario Winrock Domestic Emissions Modeling Scenario yield_increase Soil depth considered in modeling 100 cm Harvested Wood Product (HWP) Scenario HEATH Land Management Practice for Corn and Corn Stover Production Reduced-Till Forest Prorating Factor Yes 8.3.c) CO 2 Emissions from Potential Land Use Changes of Farming: grams/gal of Ethanol Corn Inclusion of CO 2 Emissions from Land Use Change 2 Domestic (Data Cell) -180 Foreign (Data Cell) 413 Domestic (Grams/Mj) -2.24 Foreign (Grams/Mj) 5.12 Total LUC (Grams/Mj) 2.89 74 Scenario 3 – Corn Ethanol 2013 Base Case, No-Till 8.3) CO 2 Emission Estimates from Land Use Changes and Land Management Changes of Farming: grams/gal of ethanol 8.3.a) Land Use Change Scenario Options Select Corn Ethanol Case Corn Ethanol 2013 Select Domestic Emissions Modeling Scenario Century Select International Emissions Modeling Scenario Winrock Domestic Emissions Modeling Scenario yield_increase Soil depth considered in modeling 100 cm Harvested Wood Product (HWP) Scenario HEATH Land Management Practice for Corn and Corn Stover Production No-Till Forest Prorating Factor Yes 8.3.c) CO 2 Emissions from Potential Land Use Changes of Farming: grams/gal of Ethanol Corn Inclusion of CO 2 Emissions from Land Use Change 2 Domestic (Data Cell) -239 Foreign (Data Cell) 413 Domestic (Grams/Mj) -2.97 Foreign (Grams/Mj) 5.12 Total LUC (Grams/Mj) 2.15 75 APPENDIX II Study & Year Clay et al (2012 LongTerm) i Clay et al (2015) ii Follett et al (2012) iii Halvorson & Stewart (2015) iv Soil Depth 0-15 cm 0-30 cm 0-150 cm 0-60 cm Tillage Various No-Till & Chisel No-Till No-Till Study Length (years) 25 5 9 7 SOC gain (Mg. /Ha./Yr.) v 0.368 0.53 2.6 0.856 Avg. Corn Yield in Study (Bushels/Ha./Yr.) vi 334 449 240 347 Ethanol Yield (Gallons/Bushel) vii 921 1240 663 959 Ethanol Energy Yield (MJ/Gallon) viii 74,144 99,826 53,378 77,214 Grams Soil Carbon /MJ ix 4.96 5.31 48.71 11.09 C to CO 2 conversion (CO = C * 3.664) x 3.664 3.664 3.664 3.664 Credit in Grams CO 2 eq./MJ xi 18.19 19.45 178.47 40.62 76 i Clay, Carbon Sequestration, supra note 110. The 2012 Clay paper includes two studies. The first, a seven-year study, estimated that surface soil carbon sequestration reduces the carbon intensity of corn ethanol by as much 19.6g CO 2 e/MJ in the North-Central and Southeast regions of North Dakota. Id. at 769 The data in this study is based on the second study, a twenty-five year study. ii Clay et al., Tillage and Corn Residue, supra note 110. iii Follett et al., supra note 113. iv Halvorson & Stewart, supra note 117. v Soil Organic Carbon (SOC) gain is expressed in annual Megagrams (Mg.) (1 Mg. = 1,000 Kg.) of carbon sequestered per year, per hectare (ha.). The .368 Mg.

SOC for Clay's 2012 study is based on the reported average over the 25 years of the study. Clay et al., Carbon Sequestration, supra note 110, at 768 ("During the past 25 yr, surface SOC amounts have increased at an average rate of 368 kg C (ha × yr).⁻¹"). The 2.65 Mg. SOC gain for Clay's 2015 study is based on the average SOC gain, with no stover removal. Clay et al., Tillage and Corn Residue, supra note 110, at 808 ("In the combined 0- to 15- and 15- to 30-cm soil zones . . . 2.65 Mg SOC ha⁻¹ were sequestered . . . in the 0% residue removal treatment[]"). The 2.6 Mg. SOC gain for Follett's study is based on the observed gain applying 120 kg/ha of nitrogen fertilizer, with no stover removal. Follett et al., supra note 113, at 873 ("At the 120 kg ha⁻¹ N fertility rate with no stover harvest, the annual increase in soil C was 2.6 Mg ha⁻¹ year.⁻¹ [.]"). The .856 Mg. SOC gain figure for Halvorson & Stewart's study is based on the annual average, with no stover removal. Halvorson & Stewart, supra note 117, at 1510 ("The estimated annual rate of SOC gain from the FR [full stover retained] treatments over the 7yr of this study would have been . . . 856 kg C h⁻¹ from the . . . 0 to 60-cm soil depths."). vi One bushel equals 25.40 kg of corn grain. See Iowa State, Ag Decision Maker Metric Conversions, C6-80 (May 2013), available at <http://bit.ly/1VxnEks>. The average yield for Clay's 2012 study is based on USDA historical data for the counties tested. Nat'l Agric. Research Serv., Quick Stats, available at http://www.nass.usda.gov/Quick_Stats/; see also Clay et al., Carbon Sequestration, supra note 110, at 768 & fig. 6. The average yield for Clay's 2015 study is based on the reported yield of 11,408 kg. per ha., with no stover removal. Clay et al., Tillage and Corn Residue, supra note 110, at 806, Table 1. The average yield for Follett's study is based on the reported figure for corn grain using 120 kg of nitrogen fertilizer per ha., with no stover removal. Follett 2012, supra note 113, at 873. The average yield for Halvorson & Stewart's study is 8,824 kg. per ha., with no stover removal. Halvorson & Stewart, supra note 117, at 1507. vii The ethanol yield is based on the USDA's average yield of 2.76 gallons per bushel in 2010, multiplied by the number of bushels produced every year. 2015 Energy Balance for the Corn-Ethanol Industry, USDA, Table 1 (Feb. 2016). viii The ethanol energy yield is based on multiplying the ethanol yield by the heating value of undenatured ethanol used by CARB: 80.53 MJ per gallon of ethanol. CARB, Calculation of Denatured Ethanol CI and CA RFG, <http://bit.ly/1oCEj9k>. ix Grams of soil carbon are derived by converting Mg. SOC gain into grams and dividing it by the ethanol energy yield. x The carbon to CO₂ conversion factor is based on a molecular weight conversion from carbon to CO₂: 1 gram of carbon = 3.664g CO₂. See Carbon Dioxide Information Analysis Center, Conversion Tables, Oak Ridge Nat'l Lab., Table 3, <http://cdiac.ornl.gov/pns/convert.html>. xi The carbon impact credit is arrived at by multiplying the carbon conversion factor by grams of soil carbon per MJ.

Sent: Wed 4/6/2016 7:36:41 PM

Subject: Meeting Materials for ECOS 2016 Spring Meeting (Apr. 10-13, Nashville)

The ECOS Shale Gas Caucus (SGC) AGENDA ECOS Spring Meeting Monday, April 11, 2016 – 7:30 – 8:45 a.m. 103C Music City Center Nashville, Tennessee Continental breakfast may be taken into the session. After focusing initially on air and methane issues, the SGC now adds water to its portfolio. The caucus kicks off this work with a discussion of “What Commissioners Need to Know about Alternative Management Strategies for Water Produced from Oil and Gas Wells.” A variety of state partners will participate. 7:30 – 7:35 a.m. Welcome and Introduction □ ECOS President Martha Rudolph, Director of Environmental Programs, Colorado Department of Public Health and Environment, and David Glatt, Chief, Environmental Health Section, North Dakota Department of Health, SGC Co-Chairs 7:35 – 7:40 a.m. Remarks on the Value of Partnerships □ Mike Smith, Executive Director, Interstate Oil and Gas Compact Commission 7:40 – 8:25 a.m. Overview of Produced Water Issues by SGC Project Partners □ Scott Anderson, Senior Policy Director, U.S. Climate and Energy Program, Environmental Defense Fund (15 minutes) □ Roy Hartstein, Vice President, Strategic Solutions, Southwestern Energy Company (10 minutes) □ Teresa Marks, Principal Advisor to the Administrator for Unconventional Oil and Gas, U.S. Environmental Protection Agency (10 minutes) □ Marni Lenahan, Energy Industry Analyst, U.S. Department of Energy (10 minutes) 8:25 – 8:45 a.m. Input, Questions, and Answers, led by Martha Rudolph and David Glatt 8:45 a.m. Call to Adjourn, Martha Rudolph and David Glatt 8 The Nexus between Environment and Public Health AGENDA ECOS Spring Meeting Monday, April 11, 2016 – 11:00 a.m. – 12:15 p.m. 104 A-D Music City Center Nashville, Tennessee This dynamic discussion will focus on techniques and approaches for enhancing partnerships between environmental regulators and public health professionals. Examples will be shared to show how decisionmaking and outcomes can be improved through these collaborations. The session will include the signing of a Memorandum of Agreement on Public and Environmental Health Initiatives by U.S. EPA, ECOS, and ASTHO. 11:00 – 11:05 a.m. Welcome and Introductions □ Martha Rudolph, Director of Environmental Programs, Colorado Department of Public Health and Environment, and ECOS President 11:05 a.m. – 12:15 p.m. Discussion □ Dr. Edward Ehlinger, Commissioner of Health, Minnesota Department of Health, and President, Association of State and Territorial Health Officials □ Dr. Thomas Burke, Deputy Assistant Administrator and Science Advisor, U.S. EPA Office of Research and Development □ Richard Oppen, Director, Montana Department of Public Health and Human Services, and Former ECOS President 12:15 p.m. Call to Adjourn, Martha Rudolph 9 Partnerships to Advance Air Quality: Focus on Ozone and Regional Haze AGENDA ECOS Spring Meeting Monday, April 11, 2016 – 1:30 p.m. – 2:30 p.m. 104 A-D Music City Center Nashville, Tennessee Under U.S. EPA’s recent tightening of the national ambient air quality standards (NAAQS) for ozone, state recommendations on nonattainment area designations are due in October. The agency also plans to finalize a rule by the end of the year updating its regional haze program and already is taking local action in many states. This roundtable will center on strategies states are pursuing to address the new ozone NAAQS and regional haze requirements. 1:30 – 1:35 p.m. Welcome and Introductions □ Bryan Shaw, Chairman, Texas Commission on Environmental Quality, Air Committee Chair 1:35 – 2:30 p.m. Roundtable Discussion □ This discussion will center on strategies states are pursuing to address the new ozone NAAQS and regional haze requirements with a focus on public-private partnerships. U.S. EPA Acting Assistant Administrator for Air and Radiation Janet McCabe will be the Air Committee guest during this discussion, and state leaders will highlight success stories and lessons learned regarding public privatepartnerships as strategies for pursuing air quality improvements. 2:30 p.m. Call to Adjourn, Bryan Shaw 10 Restoring Urban Waters to Bring Economic and Environmental Vitality Downtown AGENDA ECOS Spring Meeting Tuesday, April 12, 2016 – 9:00 – 10:15 a.m. 104 A-D Music City Center Nashville, Tennessee Representatives of state environmental agencies, U.S. EPA, and a local NGO will discuss partnerships working to restore urban waterways in cities around the country, and share transferable experiences for protecting human health and the environment. 9:00 – 10:15 a.m. Welcome and Introductions □ Sara Pauley, Director, Missouri Department of Natural Resources, Water Committee Chair 9:05 – 10:15 a.m. Discussion among Roundtable Participants, followed by Question and Answer Session, facilitated by Sara Pauley □ Martin Suuberg, Commissioner, Massachusetts Department of Environmental Protection □ Joel Beauvais, Acting Deputy Assistant Administrator, U.S. EPA Office of Water □ Mekayle Houghton, Executive Director, Cumberland River Compact 10:15 a.m. Call to Adjourn, Sara Pauley 11 The Recovered Material Role in Sustainable Materials Management: Corporate Roundtable AGENDA ECOS Spring

Meeting Tuesday, April 12, 2016 – 10:45 a.m. – Noon 104 A-D Music City Center Nashville, Tennessee
Representatives of industries at various stages of maturity – coal ash recycling, waste-to-energy, and forest products manufacturing – will spotlight strides in curbing waste streams and promoting air quality and renewable energy and discuss how states can partner in these initiatives. State and U.S. EPA experiences also will be featured. 10:45 – 10:50 a.m. Welcome and Introductions □ Todd Parfitt, Director, Wyoming Department of Environmental Quality, Waste Committee Chair 10:50 – 11:20 a.m. Discussion among Roundtable Participants □ Thomas Adams, Executive Director, American Coal Ash Association □ Paul Gilman, Ph.D., Senior Vice President and Chief Sustainability Officer, Covanta □ Paul Noe, Vice President for Public Policy, American Forest & Paper Association □ Scott Thompson, Executive Director, Oklahoma Department of Environmental Quality, Waste Committee Vice Chair 11:20 a.m. – Noon Questions and Answers and Discussion of State and U.S. EPA Experiences Noon Call to Adjourn, Todd Parfitt 12 How Lean is Your Machine? AGENDA ECOS Spring Meeting Tuesday, April 12, 2016 – 1:15 p.m. – 2:30 p.m. 104 A-D Music City Center Nashville, Tennessee This roundtable will present results of ECOS' national inventory of state lean activities and offer case studies of transformative efforts at state environmental agencies. U.S. EPA will share lean work occurring across the agency, often in partnership with states. 1:15 – 1:20 p.m. Welcome and Introductions □ John Mitchell, Director, Division of Environment, Kansas Department of Health & Environment, Innovation & Productivity Committee Chair 1:20 – 1:50 p.m. Discussion among Roundtable Participants □ John Mitchell □ Misael Cabrera, Director, Arizona Department of Environmental Quality □ Cathy Stepp, Secretary, Wisconsin Department of Natural Resources □ Sandra Connors, Director, U.S. EPA Office of Strategic Environmental Management 1:50 – 2:30 p.m. Questions and Answers and Discussion of State and U.S. EPA Experiences 2:30 p.m. Call to Adjourn, John Mitchell 13 Beyond the Bean Counting: Measuring the Impact of Environmental Enforcement AGENDA ECOS Spring Meeting Tuesday, April 12, 2016 – 2:30 – 3:30 p.m. 104 A-D Music City Center Nashville, TN This roundtable will explore how federal and state agencies are measuring the environmental, public health, and worker safety results of enforcement actions. While number of actions brought, or penalty dollars collected, can serve as indicators of results, enforcement officials are employing new and more refined approaches to communicate why actions were brought and to quantify how the environment, the public, and even violating entities will be in better positions post enforcement action. The roundtable also will show how private environmental governance approaches are supplementing state and federal enforcement activities. 2:30 – 3:30 p.m. Roundtable Discussion, moderated by Ryan Flynn, ECOS Compliance Committee Chair and Cabinet Secretary, New Mexico Environmental Department □ John Cruden, Assistant Attorney General, Environment and Natural Resources Division, U.S. Department of Justice □ Cynthia Giles, Assistant Administrator, U.S. EPA Office of Enforcement and Compliance Assurance □ Michael Vandenberg, David Daniels Allen Distinguished Chair of Law, Director, Climate Change Research Network, and Co-director, Energy, Environment and Land Use Program, Vanderbilt University School of Law 14 The Clean Power Plan – What's Next AGENDA ECOS Spring Meeting Tuesday, April 12, 2016 – 4:00 p.m. – 5:00 p.m. 104 A-D Music City Center Nashville, Tennessee After the U.S. Supreme Court stay of Clean Power Plan (CPP) implementation and as the D.C. Circuit reviews its legality, EPA and some states are moving ahead with the carbon reduction concepts, programs, and complementary activities. Other states are focusing efforts on the existing workload of core air quality protection work. The session will focus on the status of state and federal carbon oriented actions and "what's next" across the nation, providing ample opportunity for ECOS member and attendee participation. 4:00 – 4:05 p.m. Welcome and Introductions □ Martha Rudolph, Director of Environmental Programs, Colorado Department of Public Health & Environment, President, Environmental Council of the States 4:05 – 4:35 p.m. Dialogue among Panel Participants □ Avi Garbow, General Counsel, U.S. EPA □ Todd Parfitt, Director, Wyoming Department of Environmental Quality, Secretary/Treasurer, Environmental Council of the States 4:35 – 5:00 p.m. Questions and Answers and Discussion 5:00 p.m. Call to Adjourn, Martha Rudolph 15

Sent: Wed 4/6/2016 7:36:41 PM
Subject: Meeting Materials for ECOS 2016 Spring Meeting (Apr. 10-13, Nashville)

Annotated Agenda 4/06/16
The Environmental Council of the States
2016 Spring Meeting: Pathways to Partnerships: Advancing Environmental Protection
Sunday, April 10 – Wednesday, April 13, 2016
Music City Center
Nashville, Tennessee
Followed by Meeting of the E-Enterprise for the Environment Leadership Council
Wednesday, April 13 – Thursday, April 14, 2016

Notes:

- (1) Twitter users are encouraged to use #ECOSpringMtg16 to tweet about the meeting.
 - (2) Dress for the meetings is business casual.
 - (3) All meeting space is located on the main level of the Music City Center
 - (4) Draft resolutions will be posted near the registration desk.
 - (5) All meetings are open to all registrants, including press, except where indicated.
- Sunday, April 10th -- OPEN TO ALL ATTENDEES

After-Hours Tour, Buffet Dinner, and Musical Entertainment
[5:30 – 8:30 p.m.] After-Hours Tour, Buffet Dinner, and Musical Entertainment
Country Music Hall of Fame and Museum (222 5th Ave. South)
The Country Music Hall of Fame and Museum adjoins the Omni Nashville Hotel lobby. From the Omni, pass the concierge desk to the Hall of Fame lobby where guests will be directed to the museum elevators. No tickets or identification are needed. Guests may tour the museum until 7:30 p.m. and visit the souvenir shops until 6:00 p.m. or return to the shops during the meeting. In the first floor Conservatory, a cash bar opens at 6:00 p.m., buffet dinner is served at 6:30 p.m., and a seated musical performance begins at 7:30 p.m.
Monday, April 11th – OPEN TO ALL ATTENDEES UNTIL 4:00 P.M.

[7:30 – 8:45 a.m.] Continental Breakfast
103 A-B

[7:30 – 8:45 a.m.] The ECOS Shale Gas Caucus
103 C

After focusing initially on air and methane issues, the SGC now adds water to its portfolio. The caucus kicks off this work with a discussion of “What Commissioners Need to Know about Alternative Management Strategies for Water Produced from Oil and Gas Wells.” A variety of state partners will participate. Continental breakfast may be taken into the session.

Martha Rudolph of Colorado, ECOS President and SGC Co-Chair
David Glatt of North Dakota, SGC Co-Chair
Teresa Marks, AO

Marni Lenahan, Energy Industry Analyst, U.S. Department of Energy
Mike Smith, Executive Director, Interstate Oil and Gas Compact Commission
Scott Anderson, Senior Policy Director, U.S. Climate and Energy Program, Environmental Defense Fund
Roy Hartstein, Vice President, Strategic Solutions, Southwestern Energy Company

[9:00 – 10:30 a.m.] Opening Plenary Session
104 A-D

Call to Order – Martha Rudolph of Colorado, ECOS President
Host State Welcome – Nashville Mayor Megan Barry, introduced by Bob Martineau of Tennessee, ECOS Past President

Self-introduction of ECOS Officers and Members

Announcements and Agenda Preview – Martha Rudolph of Colorado

Keynote Address on the Environment-Public Health Nexus by Bryn Barnard, author of Outbreak! Plagues That Changed History, introduced by Martha Rudolph of Colorado

Preview of ECOS' New Website – Alexandra Dunn, ECOS Executive Director

[10:30 – 11:00 a.m.] Fresh Air Break, with Refreshments and Book Signing by Author Bryn Barnard

104 A-D Foyer

[11:00 a.m. – 12:15 p.m.] The Nexus between Environment and Public Health

104 A-D

This dynamic discussion will focus on techniques and approaches for enhancing partnerships between environmental regulators and public health professionals. Examples will be shared to show how decision-making and outcomes can be improved through these collaborations. The session will include the signing of a Memorandum of Agreement on Public and Environmental Health Initiatives by EPA, ECOS, and ASTHO.

Martha Rudolph of Colorado, ECOS President

Dr. Edward Ehlinger, Commissioner of Health, Minnesota Department of Health, and President, Association of State and Territorial Health Officials (ASTHO)

Dr. Tom Burke, ORD

Richard Oppen, Director, Montana Department of Public Health and Human Services, and former ECOS President

[12:15 – 1:30 p.m.] Keynote Lunch: Risk Communication and Response

103 A-B

Invited to sit at the head table during the lunch: Dr. Tom Burke

Dr. Randall Hyer, Co-founder, CrisisCommunication.net, Deputy Director, Center for Risk Communication, and co-author of the World Health Organization handbook Effective Media Communication during Public Health Emergencies

[1:30 – 2:30 p.m.] Partnerships to Advance Air Quality: Focus on Ozone and Regional Haze

104 A-D

Under EPA's recent tightening of the NAAQS for ozone, state recommendations on nonattainment area designations are due in October. The Agency also plans to finalize a rule by the end of the year updating its regional haze program and already is taking local action in many states. This roundtable will center on strategies states are pursuing to address the new ozone NAAQS and regional haze requirements.

Bryan Shaw of Texas, Air Committee Chair

Janet McCabe, OAR

[2:30 – 3:15 p.m.] Featured Address: State-Army Corps of Engineers Relations

104 A-D

Major General Donald E. (Ed) Jackson Jr., Deputy Commanding General for Civil and Emergency Operations, U.S. Army Corps of Engineers

[3:15 – 3:30 p.m.] 2018 ECOS Spring Meeting Host State Selection

104 A-D

Members will vote on a location for the 2018 ECOS Spring Meeting.

[3:30 – 4:00 p.m.] Fresh Air Break, with Refreshments

104 A-D Foyer

[4:00 – 5:00 p.m.] CLOSED SESSION: Resolutions, Bylaws Amendment, and Strategic Plan Voting

104 A-D

Open to ECOS members and their staff and ECOS staff. (No EPA Participants).

[5:00 – 5:30 p.m.] CLOSED SESSION: ECOS Executive Committee

104 A-D

Open to ECOS members and their staff and ECOS staff. (No EPA Participants).

Evening open for individually arranged dinners and Alumni Association dinner.

Tuesday, April 12th – OPEN TO ALL ATTENDEES

[6:15 – 8:30 a.m.] Optional Walking Tour

Radnor Lake State Natural Area (<http://tnstateparks.com/parks/about/radnor-lake>)

Led by Bob Martineau of Tennessee. See signup sheet and additional details on the bulletin board in the registration area. Transportation will be provided by the Tennessee Department of Environment & Conservation.

[7:30 – 9:00 a.m.] Continental Breakfast

103 A-B

[7:30 – 9:00 a.m.] CLOSED SESSION: Environmental Research Institute of the States Board Meeting

105 A

Open to states and invited guests. A separate continental breakfast will be served in the session.

David Paylor of Virginia, ERIS President

Dr. Tom Burke, ORD

Jennifer Orme-Zavaleta, ORD/NERL

Lisa Matthews, ORD

[7:30 – 9:00 a.m.] CLOSED SESSION: ECOS Data Management Workgroup

103 C

Open to states and invited guests. (No EPA Participants)

[9:00 – 10:15 a.m.] Restoring Urban Waters to Bring Economic and Environmental Vitality Downtown

104 A-D

This roundtable will feature partnerships working to restore urban waterways in cities around the country and will present transferable experiences for protecting human health and the environment.

Sara Pauley of Missouri, Water Committee Chair

Martin Suuberg, Commissioner, Massachusetts Department of Environmental Protection

Joel Beauvais, OW

Mekayle Houghton, Executive Director, Cumberland River Compact

[10:15 – 10:45 a.m.] Fresh Air Break, with Refreshments

104 A-D Foyer

[10:15 – 10:45 a.m.] Side-meeting of ECOS leaders and OW

105 A

EPA to discuss drinking water issues with ECOS leaders.

Joel Beauvais, OW

Mark Rupp, OCIR

Heather McTeer Toney & Anne Heard, Lead Region 4

Sara Parker Pauley of Missouri, Water Committee Chair

David Paylor of Virginia, Water Committee Vice Chair

Martha Rudolph of Colorado, ECOS President (invited)

John Stine of Minnesota, ECOS Vice President

Todd Parfitt of Wyoming, ECOS Secretary-Treasurer

Bob Martineau of Tennessee, ECOS Past President (invited)

Alex Dunn, ECOS Executive Director

[10:45 a.m. – 12:00 p.m.] The Recovered Material Role in Sustainable Materials Management: Corporate Roundtable

104 A-D

Representatives of industries at various stages of maturity – coal ash recycling, waste-to-energy, and forest products manufacturing – will spotlight strides in curbing waste streams and promoting air quality and renewable energy and discuss how states can partner in these initiatives. State and EPA experiences will be featured during a Q&A period.

Todd Parfitt of Wyoming, Waste Committee Chair

Thomas Adams, Executive Director, American Coal Ash Association

Paul Gilman, Ph.D., Senior Vice President and Chief Sustainability Officer, Covanta

Paul Noe, Vice President for Public Policy, American Forest & Paper Association

Scott Thompson, Executive Director, Oklahoma Department of Environmental Quality, and Waste Committee Vice Chair

Mathy Stanislaus, OLEM

[12:00 – 1:15 p.m.] Lunch with Regional Discussions

103 A-B

State attendees should be seated at designated tables with their U.S. EPA Regional Administrators or Deputy Regional Administrators. All others may be seated at non-reserved tables.

RAs and DRAs (no R2 table)

Mark Rupp, OCIR (for R9 table)

[1:15 – 2:30 p.m.] How Lean is Your Machine?

104 A-D

This roundtable will present results of ECOS' national inventory of state lean activities and offer case studies of transformative efforts at state environmental agencies. EPA will share lean work occurring across the Agency, often in partnership with states.

John Mitchell of Kansas, Innovation and Productivity Committee Chair

Misael Cabrera, Director, Arizona Department of Environmental Quality
Cathy Stepp, Secretary, Wisconsin Department of Natural Resources
Sandra Connors, OP/OSEM

[2:30 – 3:30 p.m.] Beyond Bean Counting: Measuring the Impact of Environmental Enforcement
104 A-D

This roundtable will explore how federal and state agencies are measuring the environmental, public health, and worker safety results of enforcement actions. While number of actions brought, or penalty dollars collected, can serve as indicators of results, enforcement officials are employing new and more refined approaches to communicate why actions were brought and to quantify how the environment, the public, and even violating entities will be in better positions post enforcement action. The roundtable also will show how private environmental governance approaches are supplementing state and federal enforcement activities.

Ryan Flynn of New Mexico, Compliance Committee Chair

John Cruden, Assistant Attorney General, Environment and Natural Resources Division, DOJ

Cynthia Giles, OECA

Michael Vandenbergh, David Daniels Allen Distinguished Chair of Energy, Environment and Land Use Program, Vanderbilt University School of Law

[3:30 – 4:00 p.m.] Fresh Air Break, with Refreshments

104 A-D Foyer

[4:00 – 5:00 p.m.] The Clean Power Plan: What's Next

104 A-D

After the U.S. Supreme Court stay of Clean Power Plan implementation and as the D.C. Circuit reviews its legality, EPA and some states are moving ahead with the carbon reduction concepts, programs, and complementary activities. Other states are focusing efforts on the existing workload of core air quality protection work. The session will focus on the status of state and federal carbon-oriented actions and "what's next" across the nation, providing ample opportunity for ECOS member and attendee participation.

Martha Rudolph of Colorado, ECOS President

Avi Garbow, OGC

Todd Parfitt, Director, Wyoming Department of Environmental Quality, and ECOS Secretary-Treasurer

[7:30 p.m.] Optional "We're All for the Hall" Benefit Concert featuring Keith Urban, Vince Gill, and Others

Bridgestone Arena – 501 Broadway, Nashville, Tennessee

Attendees will walk to the arena. Pre-purchased ECOS tickets will be available for pickup at the registration desk on April 12. Tickets are still available here.

Wednesday, April 13th – OPEN TO ALL ATTENDEES UNTIL 9:30 A.M.

[8:00 – 9:15 a.m.] Breakfast, with Remarks by the Honorable Bill Haslam, Governor of Tennessee, followed by Progress and Plans for the State-Federal Partnership, featuring the Honorable Gina McCarthy, U.S. EPA Administrator, and ECOS President Martha Rudolph of Colorado

103 A-B

This dialogue will highlight EPA and state priorities for the coming months, explore the rich potential of the state-federal partnership, and invite audience participation. Invited to sit at the head table during the lunch: Administrator McCarthy, Stan Meiburg, Heather McTeer Toney, and Mark Rupp.

The Honorable Bill Haslam, Governor of Tennessee

Gina McCarthy, Administrator, U.S. EPA

Martha Rudolph of Colorado, ECOS President

Alexandra Dunn, ECOS Executive Director and General Counsel (moderator)

[9:15 – 9:30 a.m.] Fresh Air Break, without Refreshments

104 A-D Foyer

[9:30 – 10:30 a.m.] CLOSED SESSION: State-U.S. EPA Roundtable

104 A-D

Discussion will focus on working cooperatively in response to crises. Open to states, U.S. EPA, federal agencies, and state association staff.

Seated on stage:

Gina McCarthy, Administrator, U.S. EPA

Stan Meiburg, Acting Deputy Administrator, U.S. EPA

Martha Rudolph of Colorado, ECOS President
John Stine of Minnesota, ECOS Vice President
Todd Parfitt of Wyoming, ECOS Secretary-Treasurer
Bob Martineau of Tennessee, ECOS Past President
Seated at tables with ECOS Members:
Regional Administrators/Deputy Regional Administrators
Nitin Natarajan, OLEM
Dr. Tom Burke, ORD

Mark Rupp, OCIR
[10:30 – 10:45 a.m.] Fresh Air Break, with Refreshments
104 A-D Foyer

[10:45 a.m. – 12:45 p.m.] CLOSED SESSION: States-Only Cutting-Edge Breakouts
103 A-B

This session will provide an opportunity for ECOS members to spend time at three topically oriented tables: methane, grants, and federal facilities (10:45 – 11:20 a.m.); nuclear decommissioning, state agency budgets, and crisis response (11:25 – 12:00 p.m.); and toxics, management innovations and lean, and Partnership Action Plans (12:10 – 12:45 p.m.). Open to states and state association staff (No EPA Participants).

[1:00 – 3:15 p.m.] CLOSED SESSION: ECOS Federal Facilities Forum
105 A

This session is open to states, federal agencies, and invited guests.
Shari Meghreblian of Tennessee, Federal Facilities Forum Chair
Stan Meiburg, Acting Deputy Administrator, U.S. EPA
Ann Heard, R4
Sam Coleman, R6
Michelle Pirzadeh, R10
Barry Breen, OLEM

Charlotte Bertrand, Greg Gervais, OLEM/FFRRO
Mark Whitney, Principal Deputy Assistant Secretary for Environmental Management, DOE
Karen Baker, Chief, Environmental Division, U.S. Army Corps of Engineers
[1:00 – 3:00 p.m.] CLOSED SESSION: Natural Resources Forum

104 A-D
This always-popular forum will include discussion of productive structures to coordinate environmental and natural resource issues. It will spotlight three case studies from ECOS members of large projects where the integration of these issues was front and center – situations involving mining, construction of recreational facilities, and species protection. The forum also will explore strategies for improving agency coordination and communication with stakeholders. Open to states and invited guests (No EPA Participants).

[2:15 – 7:00 p.m.] CLOSED SESSION: E-Enterprise for the Environment Leadership Council
103 C

Open to states, territories, tribes, and EPA.

THURSDAY, APRIL 14

[8:00 a.m. – 2:15 p.m.] CLOSED SESSION: E-Enterprise for the Environment Leadership Council
Continued

103 C
Open to states, territories, tribes, and EPA

Upcoming ECOS Meetings

July 21, 2016: State Environmental Protection (STEP) Meeting: The Water/Energy/Air Nexus
(Washington, DC)

July 22, 2016: ECOS-EPA Leadership Meeting (Washington, DC)

September 25-27, 2016: ECOS 2016 Fall Meeting (Wheeling, West Virginia)

April 6-8, 2017: ECOS 2017 Spring Meeting (Washington, DC)

TBD: ECOS 2017 Fall Meeting (Jackson Hole, Wyoming)

To: Niebling, William[Niebling.William@epa.gov]; McCabe, Janet[McCabe.Janet@epa.gov]
Cc: Koerber, Mike[Koerber.Mike@epa.gov]; Sasser, Erika[Sasser.Erika@epa.gov]; Scavo, Kimber[Scavo.Kimber@epa.gov]; Page, Steve[Page.Steve@epa.gov]; Schultz, Rebecca[Schultz.Rebecca@epa.gov]
From: Evarts, Dale
Sent: Thur 4/14/2016 12:06:09 PM
Subject: FW: Thank you note for Janet McCabe
Reply Letter to Madam Janet McCabe.pdf

Janet and William,

Attached is a "thank you for your thank you" note from DG Chen of the Jiangsu EPB that his assistant, Liu Ming, asked me to forward to you. In it, he reiterates their interest in working long term with EPA on VOC control, regional ozone control, monitoring and early warning/forecasting systems (excerpt below). In terms of responding, I recommend the following:

Deliberative

3. Continue to welcome their visits to the U.S. to learn from us and our states on these issues.

I can respond directly on your behalf or we can draft something from here for your (Janet or William) signature. Let me know how you would like to proceed.

Thanks,

Dale

effects. It is hoped to set up long-term and stable exchanges with USEPA and local environmental authorities in the US, particularly in such areas as VOC treatment, coordinated ozone control as well as ambient air quality monitoring and pre-warning, with a view to jointly exploring new cooperation opportunities and deepen environmental protection cooperation between the two sides.

From: LM [mailto:2609938221@qq.com]
Sent: Monday, April 11, 2016 6:06 AM
To: Evarts, Dale <Evarts.Dale@epa.gov>
Subject: Re: Thank you note from Janet McCabe

Dear Mr. Evarts,

Please see the attached letter from Director General Mr. Chen Mengmeng to Madam Janet McCabe. Please help me forward it to her. A hardcopy will be sent to her via mail. Thank you.

Best Regards

Liu Ming

----- Original -----

From: "Evarts, Dale"; <Evarts.Dale@epa.gov>;

Date: Wed, Apr 6, 2016 00:45 AM

To: "cmm@jshb.gov.cn" <cmm@jshb.gov.cn>;

Cc: "czpepb@163.com" <czpepb@163.com>; "Schultz, Rebecca" <Schultz.Rebecca@epa.gov>; "LM" <2609938221@qq.com>;

Subject: Thank you note from Janet McCabe

Dear Director General Chen,

Please see the attached note from Acting Assistant Administrator Janet McCabe. A hardcopy has been sent to you via mail.

Best regards,

Dale

Dale M Evarts

Group Leader, Climate, International and Multimedia Group

Office of Air Quality Planning and Standards (C504-04)

US Environmental Protection Agency

Research Triangle Park, NC USA 27711

Office: +1 919 541 5535

Cell: **Personal Privacy**

Evarts.Dale@epa.gov

江苏省环境保护厅

To: Madam Janet G. McCabe
Acting Assistant Administrator of USEPA

Apr.11, 2016

Dear Madam Janet G. McCabe,

I would like to extend my gratitude to you for your letter, and heading a delegation to Nanjing to attend the Technical Assistance for the China Air Quality Management Program Final Workshop, where we jointly harvested fruitful results from the program.

Since the implementation of the Program, both sides have conducted a series of fruitful discussions on urban air quality assessment, formulation of air quality management plan, air quality treatment in heavy pollution industries and ambient air monitoring. It has made urban air quality treatment in Jiangsu more scientific and accurate and played a positive role in improving ambient air quality in Jiangsu. Hereby, on behalf of Jiangsu Provincial Environmental Protection Department, I would like to extend heartfelt thanks to you and experts from USEPA for the gracious support.

Several years ago, Jiangsu EPD sent three batches of technical staff to further their studies in South Coast Air Quality Management District, which has resulted in good effects. It is hoped to set up long-term and stable exchanges with USEPA and local environmental authorities in the US, particularly in such areas as VOC treatment, coordinated ozone control as well as ambient air quality monitoring and pre-warning, with a view to jointly exploring new cooperation opportunities and deepen environmental protection cooperation between the two sides.

I expect you to visit Jiangsu again at your convenience.

Yours sincerely



Chen Mengmeng

Director General, Jiangsu Provincial Environmental Protection Department

To: Dunkin, Ann[Dunkin.Ann@epa.gov]
Cc: Fine, Steven[fine.steven@epa.gov]; Millett, John[Millett.John@epa.gov]; Slade, Reginald[Slade.Reginald@epa.gov]; Dennis, Allison[Dennis.Allison@epa.gov]; Suarez, Patricia[suarez.patricia@epa.gov]
From: Shaw, Betsy
Sent: Wed 4/13/2016 6:47:26 PM
Subject: Re: Action: Work plan requirement for incomplete Web Plan topic
OAR Plan for FY2016 Drupal Transformation April 2016 update.docx
ATT00001.htm

Hi Ann,

Thank you for your encouraging words. We could not have met this milestone without the tremendous support OEI has continued to provide to our programs, for which we continue to be very grateful.

We've met the March 31st deadline for all but one of our Quarter Two sites listed in the attached FY2016 OAR Web Conversion Plan. The publishing delay for our "Transportation, Air Quality and Climate Change" site was due to unforeseen expanded internal review for this site's inclusion of new and improved content and messaging. We are confident this site will be launched ahead of the Quarter 3 June 30th deadline.

You will notice we made a few updates to our Web Conversion Plan. These include:

- **Added a few topics:** We've added a few more topics to our to-do list, notably breaking up our very large climate change website into several, smaller microsites due to Drupal navigation restrictions.
- **Removed a few topics:** We've removed Green Racing and Community Involvement as topics to transform—we will archive them instead.
- **Swapped the timing for two topics:** We inadvertently listed OTAQ's Fuel Economy and Health Effects from Transportation Pollution sites in the wrong quarters. These are now listed correctly.

Finally, I wanted to let you know that John Millett will be stepping in as OAR's Web Council Representative and Drupal Lead replacing the wonderful Allison Dennis who will be starting a much-deserved detail with the Office of Water beginning Monday, April 18th. If your staff have any questions, John can be reached at 202-

564-2903.

Thanks,

Betsy

Below is comprehensive list of OAR's remaining web topics to be published in Drupal in FY2016. This refreshed list includes a few additional topics (see bolded web areas). Green font represents topics launched in Drupal and web topics with a strike-out line represent topics OAR is no longer pursuing.

Quarter 1 – Dec. 31, 2015	Quarter 2 – March 31, 2016	Quarter 3 – June 30, 2016	Quarter 4 – September 30, 2016
<ol style="list-style-type: none"> 1. Combined Heat and Power Partnership (OAP) 2. Hazardous Air Pollutants (OAQPS) 3. National-Scale Air Toxics Assessments (OAQPS) 4. Operating Permits (OAQPS) 5. NSR Permitting (OAQPS) 	<ol style="list-style-type: none"> 6. Acid Rain (OAP) 7. Ozone Layer Protection (OAP) 8. Motor Vehicle Air Conditioning (OAP) 9. Phase-out of Ozone-Depleting Substances (OAP) 10. Stationary Refrigeration and Air Conditioning (OAP) 11. Green Power Partnership (OAP) 12. Climate and Energy Resources for State, Local and Tribal Governments (OAP) 13. Air Quality Data and Tools landing page (OAQPS) 14. Voluntary Programs landing page (OAQPS) 15. Community Involvement (OAQPS) 16. Advance (OAQPS) 17. Criteria Air Pollutants landing page (OAQPS) 18. Lead Pollution (OAQPS) 19. Ozone Pollution (OAQPS) 20. Ozone Designations (OAQPS) 21. Stationary Sources landing page (OAQPS) 22. Agriculture, Food and Forest Products (OAQPS) 23. Chemical Production and 	<ol style="list-style-type: none"> 24. Cross State Rulemaking 25. Emissions Trading Resources (OAP) 26. Collision Repair (OAQPS) 27. Training (OAQPS) 28. Energy Efficiency and Renewable Energy (OAQPS) 29. Particle Pollution (OAQPS) 30. Sulfur Dioxide Pollution (OAQPS) 31. Lead Designations (OAQPS) 32. Nitrogen Dioxide Designations (OAQPS) 33. Sulfur Dioxide Designations (OAQPS) 34. Electric Utilities (OAQPS) 35. Mercury and Air Toxics Standards (OAQPS) 36. Metals Production (OAQPS) 37. Mineral Processing (OAQPS) 38. Oil & Nat. Gas Production & Distribution (OAQPS) 39. Agricultural Monitoring (OAQPS) 40. General Conformity (OAQPS) 41. Air Pollution Transportation Models (OTAQ) 42. Motor Vehicle Emissions 	<ol style="list-style-type: none"> 43. Climate Change Landing Page (OAP) 44. Climate Indicators (OAP) 45. Climate Change Science (OAP) 46. Greenhouse Gas Emissions (OAP) 47. Climate Impacts (OAP) 48. Global Mitigation of Non-CO2 GHG Report (OAP) 49. Global Methane Initiative (OAP) 50. High-Global Warming Potential Voluntary Programs (OAP) 51. Coalbed Methane Outreach (OAP) 52. Landfill Methane Outreach Program (OAP) 53. Natural Gas STAR (OAP) 54. AirData (OAQPS) 55. AirTrends (OAQPS) 56. Air Emissions Sources (OAQPS) 57. Carbon Monoxide Pollution (OAQPS) 58. Nitrogen Dioxide Pollution (OAQPS) 59. Particle Pollution Designations (OAQPS) 60. Secondary Air Pollution Standards for Nitrogen Dioxide and Sulfur Dioxide (OAQPS) 61. Energy, Engines, and Combustion (OAQPS) 62. Petroleum Refineries and Distribution (OAQPS) 63. Semiconductor Manufacturing (OAQPS) 64. Solvent Use and Surface Coating (OAQPS) 65. Sterilizers (OAQPS) 66. Waste Management (OAQPS) 67. Health Effects Notebook (OAQPS) 68. Oil and Gas Production (OAQPS) 69. Stationary Engines (OAQPS)

Updated April 7, 2016

	<p>Distribution (OAQPS)</p> <p>23. Generic Chemical Rules</p> <p>23. Foam, Fiber, Plastics and Rubber Products (OAQPS)</p> <p>23. Visibility (OAQPS)</p> <p>23. Air Quality Management Process (OAQPS)</p> <p>23. Verified Technologies for SmartWay and Clean Diesel (OTAQ)</p> <p>23. Emission Standards Reference Guide (OTAQ)</p> <p>23. Green Vehicle Guide (OTAQ)</p> <p>23. Green Racing (OTAQ)</p> <p>23. Vehicle and Fuel Emissions Testing (OTAQ)</p> <p>23. Tribal Air & Climate Resources (OAR IO)</p>	<p>Simulator (MOVES) Model (OTAQ)</p> <p>42. State and Local Transportation (OTAQ)</p> <p>42. SmartWay (OTAQ)</p> <p>42. Health Effects from Transportation Pollution (OTAQ)</p> <p>42. Air Pollution and Climate Change from Transportation (OTAQ)- moved from Q2</p>	<p>Boilers & Process Heaters (OAQPS)</p> <p>71. Petroleum Refineries (OAQPS)</p> <p>72. Technical Air Resources (OAQPS)</p> <p>73. TTN-Air Emissions Modeling (OAQPS)</p> <p>74. TTN-Air Emissions Factors (OAQPS)</p> <p>75. TTN-Air Emission Measurement Center (OAQPS)</p> <p>76. TTN-Air Quality Models (OAQPS)</p> <p>77. TTN-Air Quality Monitoring (OAQPS)</p> <p>78. TTN-Clean Air Technology Center (OAQPS)</p> <p>79. TTN-Economic & Cost Analysis (OAQPS)</p> <p>80. TTN-Electronic Air Emissions Reporting & Recordkeeping (OAQPS)</p> <p>81. TTN-Emissions Monitoring Knowledge Base (OAQPS)</p> <p>82. TTN – Clearinghouse for Inventories and Emissions Factors</p> <p>83. TTN – Reviewing NAAQS- Scientific and Technical Information (OAQPS)</p> <p>84. Outdoor Air Pollution landing page (OAQPS)</p> <p>85. AQ Reg and Standards for Vehicles and Engines (OTAQ)</p> <p>86. GHG Regs and Standards for Vehicles and Engines (OTAQ)</p> <p>87. Air Toxics from Transportation Pollution (OTAQ)</p> <p>88. Certification and Compliance Help for Vehicle and Engine Manufacturers (OTAQ)</p> <p>89. Fuel Economy (OTAQ)</p> <p>90. Vehicle and Engines Landing Page (OTAQ)</p> <p>91. Certification and Fuel Economy Data for Vehicles and Engines (OTAQ)</p>
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Updated April 7, 2016

			Violations and Recalls for Vehicles and Engines
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To: Mccarthy, Gina[McCarthy.Gina@epa.gov]
Cc: McCabe, Janet[McCabe.Janet@epa.gov]; Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]
From: Matt Godlewski
Sent: Tue 4/12/2016 8:37:52 PM
Subject: Natural Gas Vehicle NOx Reduction Projects
EPA Adminstrator McCarthy - 4.11.16 - FINAL.PDF

Dear Administrator McCarthy:

Please find attached a letter and white paper regarding NGV projects that could provide substantial NOx reductions as part of Supplemental Environmental Projects related to any settlement in the Volkswagen matter. We stand ready to meet with you or your team to discuss these projects in greater detail.

Sincerely,

Matthew Godlewski

President

NGV**America**

400 N. Capitol St. NW, Washington, D.C. 20001

202.824.7397 [o] | 202.306.2985 [m]

mgodlewski@ngvamerica.org

ngvamerica.org; ngv.com

April 11, 2016

The Honorable Gina McCarthy
Administrator
Environmental Protection Agency
1200 Pennsylvania Ave NW
Washington, DC 20460

Dear Administrator McCarthy:

We are writing to strongly encourage the Environmental Protection Agency to ensure that any settlement intended to resolve the nitrogen oxide (NOx) emissions from Volkswagen's non-compliant diesel vehicles include projects utilizing the latest natural gas engine technology.

An unprecedented opportunity exists to leverage private investment to dramatically improve air quality in the most polluted urban areas of the country. We strongly believe that Supplemental Environmental Projects (SEPs) involving heavy-duty natural gas trucks can play a cost effective role to lower NOx emissions in areas with the most urgent need.

The latest natural gas engine technology provides substantial nitrogen oxide (NOx) emission reductions over and above what is currently available or achievable with new diesel engines. This new "Near-Zero" technology was certified in 2015 by both EPA and the California Air Resources Board as reducing NOx emissions by more than 90 percent compared to current heavy duty engine standards. This technology advancement was developed through the combined efforts and funding by Cummins Westport, the California Energy Commission and the South Coast Air Quality Management District.

The attached document outlines specific projects that could replace older and even new diesel trucks with natural gas trucks powered with "Near-Zero" engines. In terms of cost and scalability, these NGV projects provide the single most effective pathway to reducing NOx and addressing the excess NOx emissions associated with Volkswagen's non-compliant diesel vehicles. Over its lifetime, each natural gas truck put on the road under these proposals will offset as much as 1 to 2 tons of NOx emissions.

Electric vehicle projects intended to offset a similar amount of emissions would have to incentivize and deploy a much larger number of total vehicles at a significantly higher total cost. It would take 43 light duty electric vehicles to offset the same amount of NOx emissions reduced by deploying one new natural gas "Near-Zero" truck, making the natural gas program 9 to 13 times more cost effective than one solely involving EVs (the attached document provides detail on the related assumptions).

Furthermore, these projects are compelling given that they deliver surplus emission reductions. The Administration's new National Ambient Air Quality standards will require more counties and cities to find solutions to solve ozone-related pollution and reduce contributing NOx emissions. An historic opportunity exists through SEPs or other settlement programs in the Volkswagen matter for private investment to dramatically improve air quality in these areas. The deployment of new, cleaner "Near-Zero" natural gas engines in regional haul trucking, refuse trucks and transit buses can directly target NOx pollution in areas with the most urgent need.

Attached for your review is a short white paper that outlines three projects that have significant merit and could provide substantial NOx reductions as part of SEPs or other programs related to this case. We respectfully request an opportunity to meet with you and/or your representatives to discuss this matter in greater detail and explore the important opportunity that exists for natural gas vehicles to play a role in improving air quality in communities across the country.

Sincerely,



Matthew Godlewski, President
Natural Gas Vehicles for America



Dave McCurdy, President & CEO
American Gas Association



Sharon Kneiss, President & CEO
National Waste & Recycling Association



Bert Kalisch, President & CEO
American Public Gas Association



Johannes Escudero, Executive Director
Coalition for Renewable Natural Gas

Heavy Duty Natural Gas Vehicle NOx Reduction Projects

Overview

Projects utilizing heavy-duty natural gas vehicles (NGVs) provide a substantial opportunity to reduce mobile source related nitrogen oxide (NOx) emissions. In terms of cost and scalability, projects involving the replacement of old or new diesel trucks provide the most attractive pathway to significantly offset NOx emissions. These reductions are possible because the latest natural gas engine technology actually delivers substantial surplus NOx emission reductions. Programs to accelerate the deployment of these engines in heavy-duty applications such as regional haul trucking, refuse trucks and transit buses provide an opportunity to dramatically address NOx pollution in areas of the country with the most urgent need.

Background – “Near-Zero” Natural Gas Engine Technology

In 2015, the California Air Resources Board (CARB) certified the Cummins Westport (CWI) 8.9 liter ISL G “Near-Zero” heavy duty natural gas engine to a level of 0.02 g/bhp-hr of NOx – a level of emissions that is one-tenth of the current NOx standard of (0.2 g/bhp-hr) for heavy-duty engines. Each engine certified to this level is 90% cleaner and provides surplus emission reductions beyond those required by law. The California Energy Commission and the South Coast Air Quality Management District partnered with CWI to develop this engine to address the urgent need to dramatically reduce ozone forming NOx emissions. This engine will go into production in April 2016.

A larger 11.9 liter version of the engine is completing development and will be following soon. At the 0.02 NOx emission level, each new natural gas Class 8 truck that operates with this engine will displace or offset almost 1 ton of NOx over its lifetime. Strategies involving light-duty (LD) electric vehicles (EVs) are estimated to reduce 0.022 tons of nitrogen oxide over the lifetime of each EV deployed, or 43 times fewer emissions than offset by a natural gas truck. (Both examples include benefits matched to comparable new diesel trucks or new gasoline powered cars; replacing older vehicles would be even more significant and in the case of natural gas trucks as much as 2 tons per truck could be offset).

The reason natural gas trucks have such a significant advantage over electric vehicles is simple: 90 percent emissions improvement of a large NOx number with an estimated truck (combination short-haul tractor) life of 931,700 miles is more significant than 100 percent of a very small NOx number on a LD EV with 275,000 lifetime miles (mileage figures based on EPA MOVES model). Deploying one new “Near-Zero” natural gas truck offsets as much NOx as 43 EVs. This underscores why natural gas trucks from a scalability stand point are so attractive since it takes far fewer natural gas trucks to offset a given amount of NOx. Additionally, with the annual class 8 new truck replacement typically in the range of 200,000 vehicles, it is feasible to achieve market penetration results providing these significant NOx offsets within three to five years.

Project 1 – Incentive Program to Deploy “Near-Zero” HD Vehicles in Nonattainment Areas

This proposal offers the most significant and measurable approach to impact NOx improvement. Given the new National Ambient Air Quality Standards (NAAQS), more counties and cities will be in areas of nonattainment impacted with severe ozone-related pollution that is directly caused by NOx emissions.

These communities could improve air quality quickly through a program to incentivize regional fleets or heavy-duty vehicles operating in or serving nonattainment areas to retire existing diesel trucks, or switch purchases of new diesel vehicles to natural gas trucks powered with the “Near-Zero” technology.

A major obstacle to the deployment of alternative fueled vehicles is the higher incremental cost compared to conventional diesel vehicles. A program that establishes a \$50,000 cash incentive toward the buy down of a “Near-Zero” HD truck, particularly in nonattainment zones would get cleaner natural gas trucks on the road and deliver immediate benefits in a far more cost-effective way than a comparable EV incentive program. As demonstrated below, significant tons of NOx can be reduced:

	Low	Mid	High
Tons of NOx Offset	13,976	27,951	59,000
Natural Gas Near-Zero HD Trucks	15,000	30,000	63,324
Incentive Program Cost @ \$50k per truck	\$750,000,000	\$1,500,000,000	\$3,166,200,000
Equivalent LD EV's required	646,352	1,292,703	2,728,640
EV Cost Lower @ \$10k per vehicle	\$6,463,515,569	\$12,927,031,138	\$27,286,402,149
EV Cost Upper @ \$15k per vehicle	\$9,695,273,353	\$19,390,546,708	\$40,929,603,224

A program involving natural gas trucks is estimated to be 9 to 13 times more cost effective than one solely focused on EVs. For these calculations, the buy down or incremental cost per natural gas truck is \$50,000. The buy down or rebate incentive for EVs would be \$10,000 - \$15,000 per vehicle (on top of existing federal incentives). Based on these estimates, the cost of NOx reduced is about \$54,000/ton with a “Near-Zero” HD NGV program, while the EV program cost is \$462,000 - \$694,000/ton.

A program involving natural gas trucks can deliver significant NOx reductions and will be less costly and easier to implement since fewer total vehicles will be required. While a truck program can be broadly implemented, additional targeted programs can be offered focusing on disadvantaged communities affected by goods movement at port facilities, urban commercial centers and along congested corridors in areas with the worst air quality problems.

The NGV industry has extensive experience in implementing incentive programs across the nation and would work with Volkswagen and regulators to craft an effective offering to generate results. Properly implemented, this buy down incentive would be sufficient to encourage large fleets already operating in key areas to make the investment to retire older vehicles to get new clean-burning, low-emission natural gas trucks on the road.

Project 2 – Incentive Program to Deploy “Near-Zero” Vocational Vehicles in Municipalities

Natural gas transit / airport buses and refuse trucks are some of the most successful markets to date for NGVs. Many municipalities have made significant commitments to expanding their use of natural gas vocational vehicles in an effort to lower fuel costs and take advantage of the simple emission control technology (compared to diesel) deployed on natural gas trucks. Many major cities throughout the country operate natural gas fleets and many are seeking to replace aging vehicles. A program aimed at deploying new “Near-Zero” powered transit and refuse vehicles in municipal fleets, including their contracted carriers and franchise operators, would reduce NOx emissions in areas with air quality problems and could take advantage of existing refueling infrastructure. To provide the most significant overall emissions benefit this program could also target non-attainment areas and provide a range of cash buy down incentives toward refuse trucks and transit buses powered by “Near-Zero” technology.

Project 3 – Deploy “Near-Zero” HD Vehicles in the Volkswagen Fleet for Parts/Goods Movement

Volkswagen ships parts, components and finished vehicles across North America. The fleet of vehicles used to conduct these operations has significant emissions that could be dramatically lowered by deploying vehicles with “Near-Zero” technology. Furthermore, these vehicles could also take advantage of renewable natural gas (biomethane) to reduce overall GHG emissions by 95% or greater. The combination of “Near-Zero” technology for NOx and biomethane for GHG would deliver an overall emissions profile cleaner than electric vehicles (factoring in upstream emissions) in most areas and would be the cleanest shipping fleet in the country.

Other automotive companies have begun to deploy natural gas trucks either directly into fleets that they operate, or through requirements they negotiate with their contract carriers. FCA is operating 179 natural gas trucks between its facilities in Detroit and Canada to deliver parts for its automotive factories. Toyota and Honda have deployed natural gas trucks regionally to deliver components and vehicles. However, no automaker has currently deployed “Near Zero” technology or biomethane as a central part of their strategy. This project offers a significant opportunity to reduce NOx and GHG emissions with the cleanest fleet in North America.

To: McCabe, Janet[McCabe.Janet@epa.gov]
Cc: Page, Steve[Page.Steve@epa.gov]
From: Koerber, Mike
Sent: Mon 4/11/2016 2:26:06 PM
Subject: FW: Timely guidance
Guidances revised 4-11-16.docx

Here is the list from Anna.

-----Original Message-----

From: Wood, Anna
Sent: Monday, April 11, 2016 9:29 AM
To: Koerber, Mike <Koerber.Mike@epa.gov>
Cc: Page, Steve <Page.Steve@epa.gov>
Subject: FW: Timely guidance

Hi Mike, here is the list Janet asked for. These are the guidance and rules issued since 2010 ish time frame to assist states with NAAQS implementation. How do you want to get this to Janet as I know she needs it for her ECOS meeting today. Please let me know if you want me to do anything, thx

-----Original Message-----

From: McCabe, Janet
Sent: Friday, April 08, 2016 6:49 PM
To: Wood, Anna <Wood.Anna@epa.gov>; Koerber, Mike <Koerber.Mike@epa.gov>
Cc: Page, Steve <Page.Steve@epa.gov>
Subject: Timely guidance

Anna--I seem to remember that you keep a list and schedule of guidances issues and underway that show the time between finalization of rules and issuance (or projected issuance) of guidance.

I'm meeting with ECOS Monday afternoon on air issues and I think the issue of timely guidance will come up. I'd like to be able to talk about how we've been getting guidance out more and more timely and give some specific examples.

Please don't have anyone create anything new, but if you could send whatever materials exist that help with this kind of detail so I'd have it over the weekend or Monday morning, I'd appreciate it.

Thanks

Sent from my iPhone

Office of Air Quality Planning and Standards

Rules / Guidances / Memoranda Released Since 2010 Related to Implementation of the NAAQS and NSR and Title V Permitting

Revised: April 11, 2016

Date	Title	File
NAAQS Implementation		
NO₂		
2/17/12	Air Quality Designations for the 2010 Primary Nitrogen Dioxide (NO ₂) National Ambient Air Quality Standards (Final – 77 FR 9532; signed 1/20/12)	http://www.gpo.gov/fdsys/pkg/FR-2012-02-17/pdf/2012-3150.pdf
<i>Abstract:</i> This final rule establishes air quality designations for all areas in the United States for the 2010 Primary NO ₂ NAAQS.		
11/24/14	Findings of Failure to Submit a Complete State Implementation Plan for Section 110(a) Pertaining to the 2010 Nitrogen Oxide (NO ₂) Primary National Ambient Air Quality Standard (Final – 79 FR 69769; signed 11/14/14)	http://www.gpo.gov/fdsys/pkg/FR-2014-11-24/pdf/2014-27679.pdf
<i>Abstract:</i> This final rule takes action finding that the District of Columbia and seven states have not submitted complete ISIPs that provide the basic CAA program elements necessary to implement the 2010 NO ₂ primary NAAQS.		
SO₂		
3/24/11	Area Designations for the 2010 Revised Sulfur Dioxide National Ambient Air Quality Standards	http://www3.epa.gov/airquality/sulfurdioxide/pdfs/20110411so2designationsguidance.pdf
<i>Abstract:</i> This memorandum provides information on the schedule and process for designating areas for the purpose of implementing the 2010 revised primary SO ₂ NAAQS.		
11/7/11	Final Response to Petition from New Jersey Regarding SO ₂ Emissions from the Portland Generating Station (Final – 76 FR 6952; signed 10/31/11)	http://www.state.nj.us/dep/baqp/petition/EPA.pdf
<i>Abstract:</i> The EPA is making a finding that the coal-fired Portland Generating Station (Portland), owned and operated by GenOn REMA LLC (GenOn), in Upper Mount Bethel Township, Northampton County, Pennsylvania, is emitting air pollutants in violation of the interstate transport provisions of the CAA. Specifically, the EPA finds that emissions of SO ₂ from Portland significantly contribute to nonattainment and interfere with maintenance of the 1-hour SO ₂ NAAQS in New Jersey. This finding is made in response to a petition submitted by the NJDEP on 9/17/10. In this action, the EPA is establishing emission limitations and compliance schedules to ensure that Portland will eliminate its significant contribution to nonattainment and interference with maintenance of the 1-hour SO ₂		

NAAQS in New Jersey. Compliance with these limits will permit the continued operation of Portland beyond the 3-month limit established by the CAA for sources subject to a contribution finding.

2/6/13 Next Steps for Area Designations and Implementation of the Sulfur Dioxide National Ambient Air Quality Standard <http://www3.epa.gov/airquality/sulfurdioxide/pdfs/20130207SO2StrategyPaper.pdf>

Abstract: This paper describes the EPA's updated strategy for completing initial area designations under the June 2010 1 - hour primary SO₂ NAAQS.

8/5/13 Air Quality Designations for the 2010 Sulfur Dioxide Primary National Ambient Air Quality Standard (Final – 78 FR 47191; signed 6/25/13) <http://www.gpo.gov/fdsys/pkg/FR-2013-08-05/pdf/2013-18835.pdf>

Abstract: This final rule establishes air quality designations for certain areas in the United States for the 2010 primary SO₂ NAAQS.

4/23/14 Guidance for 1-Hour SO₂ Nonattainment Area SIP Submissions <http://www3.epa.gov/airquality/sulfurdioxide/pdfs/20140423guidance.pdf>

Abstract: The purpose of this memorandum is to distribute a non-binding guidance titled, "Guidance for 1-Hour SO₂ Nonattainment Area SIP Submissions." The document is intended to provide guidance and recommendations to state, local and tribal governments for the development of SIPs and TIPs under the 2010 1-hour primary SO₂ NAAQS.

3/20/15 Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standards <http://www3.epa.gov/airquality/sulfurdioxide/pdfs/20150320SO2designations.pdf>

Abstract: This memorandum contains revised guidance for developing updates to state recommendations for initial area designations for the 2010 SO₂ NAAQS in accordance with court-ordered schedule for issuing all initial area designations by December 31, 2020. Includes new recommendations for developing and using modeling results to determine if air quality in a specific area meets or does not meet the NAAQS.

8/21/15 Data Requirements Rule for 1-hr Sulfur Dioxide (SO₂) Primary National Ambient Air Quality Standard (Final – 80 FR 50152; signed 8/10/15) <http://www.gpo.gov/fdsys/pkg/FR-2015-08-21/pdf/2015-20367.pdf>

Abstract: The final rule directs state and tribal air agencies (air agencies) to provide data to characterize current air quality in areas with large sources of sulfur dioxide (SO₂) emissions to identify maximum 1-hour SO₂ concentrations in ambient air. The final rule establishes minimum criteria for identifying the emissions sources and associated areas for which air agencies are required to characterize SO₂ air quality. Air agencies remain free to also characterize air quality in additional areas beyond those required to be characterized under the rule. The final rule also sets forth a process and timetables by which air agencies must characterize air quality through ambient

monitoring and/or air quality modeling techniques and submit such data to the EPA. The EPA has issued separate non-binding draft technical assistance documents recommending how air agencies should conduct such monitoring or modeling. The air quality data developed by air agencies pursuant to this rule may be used by the EPA in future actions to evaluate areas' air quality under the 2010 1-hour SO₂ National Ambient Air Quality Standard (NAAQS), including area designations and redesignations, as appropriate.

3/18/16 Findings of Failure to Submit State Implementation Plans Required for Attainment of the 2010 1-Hour Primary Sulfur Dioxide National Ambient Air Quality Standards (Final – 81 FR 14736; signed 3/10/16) <https://www.gpo.gov/fdsys/pkg/FR-2016-03-18/pdf/2016-06063.pdf>

Correction Notice (Final – publication TBD; signed 3/8/16)

Abstract: This action finds that several states failed to submit SIPs to satisfy certain nonattainment area planning requirements of the CAA for the 2010 1-hour primary SO₂ NAAQS.

PM

4/16/13 Initial Area Designations for the 2012 Revised Primary Annual Fine Particulate National Ambient Air Quality Standards <http://www3.epa.gov/pmdesignations/2012standards/docs/april2013guidance.pdf>

Abstract: This memorandum provides information on the schedule and process for initially designating areas for the purposes of implementing the 2012 revised PM_{2.5} NAAQS.

6/2/14 Identification of Nonattainment Classification and Deadlines for Submission of State Implementation Plan Provisions for the 97 Fine Particle (PM_{2.5}) NAAQS and 2006 PM_{2.5} NAAQS (Final – 79 FR 31566; signed 4/25/14) <http://www.gpo.gov/fdsys/pkg/FR-2014-06-02/pdf/2014-10395.pdf>

Abstract: This final rule identifies the classification under subpart 4 for areas currently designated nonattainment for the 1997 and/or 2006 PM_{2.5} standards, the deadlines for states to submit attainment-related and NNSR SIP elements required for these areas pursuant to subpart 4, and the EPA guidance that is currently available regarding subpart 4 requirements.

1/15/15 Air Quality Designations for the 2012 Primary Annual Fine Particle (PM_{2.5}) National Ambient Air Quality Standards (NAAQS); Final Rule (Final – 80 FR 2206; signed 12/18/14) <http://www.gpo.gov/fdsys/pkg/FR-2015-01-15/pdf/2015-00021.pdf>

Abstract: This final rule establishes air quality designations for most areas in the U.S., including areas of Indian country, for the 2012 primary PM_{2.5} NAAQS.

3/23/15 Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements (NPRM – 80 FR 15340; signed 3/10/15) <http://www.gpo.gov/fdsys/pkg/FR-2015-03-23/pdf/2015-06138.pdf>

Abstract: This rule proposes requirements that state, local and tribal air agencies would have to meet as they implement the current and future national ambient air quality standards (NAAQS) for fine particulate matter (PM_{2.5}).

4/7/15 Additional Air Quality Designations and Technical Amendment to <http://www.gpo.gov/fdsys/pkg/FR-2015-04->

	Correct Inadvertent Error in Air Quality Designations for the 2012 Primary Annual Fine Particle (PM _{2.5}) National Ambient Air Quality Standards (NAAQS) (Final – 80 FR 18535; signed 3/31/15)	07/pdf/2015-07948.pdf
<i>Abstract:</i> This rule establishes initial area designations for 5 areas that were deferred in the January 18, 2015 notice, and changes the initial designations from ‘nonattainment’ to ‘unclassifiable/attainment’ or ‘unclassifiable’ for 5 areas based on state-submitted early-certified 2014 monitoring data showing that air quality meets the NAAQS. Effective date of designations is April 15, 2015.		
7/29/15	Air Quality Designations for the 2006 24-Hour Fine Particle National Ambient Air Quality Standards (2006 24-hour PM _{2.5} NAAQS), 1997 Annual PM _{2.5} NAAQS, and 1987 Annual Coarse Particle (PM ₁₀) NAAQS; Technical Amendments to Inadvertent Error (Final – 80 FR 45067; signed 7/21/15)	http://www.gpo.gov/fdsys/pkg/FR-2015-07-29/pdf/2015-18532.pdf
<i>Abstract:</i> This final action makes technical amendments to address several minor, inadvertent and nonsubstantive errors in the regulatory text establishing the air quality designations for the 2006 24-hour fine particle (PM _{2.5}) National Ambient Air Quality Standards (NAAQS), 1997 annual PM _{2.5} NAAQS, and 1987 annual coarse particle (PM ₁₀) NAAQS. The states to which these amendments apply are New York and West Virginia.		
3/17/16	Information on the Interstate “Good Neighbor” Provision for the 2012 Fine Particulate Matter National Ambient Air Quality Standards under Clean Air Act Section 110(a)(2)(D)(i)(1)	https://www3.epa.gov/airquality/particlepollution/pdfs/good-neighbor-memo.pdf
<i>Abstract:</i> This memorandum provides information to the EPA Regional Offices and the states as they develop and review SIPs that address the interstate transport provision of the CAA section 110(a)(2)(D)(i)(1) otherwise known as the “Good Neighbor” provision, as it pertains to the 2012 PM _{2.5} NAAQS.		
Ozone		
9/22/11	Implementation of the Ozone National Ambient Air Quality Standard	http://www3.epa.gov/airquality/ozonepollution/pdfs/OzoneMemo9-22-11.pdf
<i>Abstract:</i> The purpose of this memorandum is to clarify for state and local air agencies the status of the 2008 ozone NAAQS and to outline implementation steps moving forward.		
5/21/12	Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards (Final – 77 FR 30088; signed 4/30/13)	http://www.gpo.gov/fdsys/pkg/FR-2012-05-21/pdf/2012-11618.pdf
<i>Abstract:</i> This rule establishes initial air quality designations for most areas in the United States, including areas of Indian country, for the 2008 primary and secondary national ambient air quality standards (NAAQS) for ozone.		
5/21/12	Implementation of the 2008 National Air Quality Standards for Ozone: Nonattainment Area Classifications Approach, Attainment Deadlines and Revocation of the 1997 Ozone Standards for Transportation Conformity Purposes (Final – 77 FR 30160; signed 4/30/13)	http://www.gpo.gov/fdsys/pkg/FR-2012-05-21/pdf/2012-11605.pdf

<i>Abstract:</i> This final rule establishes air quality thresholds that define the classifications assigned to all nonattainment areas for the 2008 ozone NAAQS which were promulgated on 3/12/08.		
6/11/12	Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards for Several Counties in Illinois, Indiana, and Wisconsin; Correction to Inadvertent Errors in Prior Designations (Final – 77 FR 34221; signed 5/31/12)	http://www.gpo.gov/fdsys/pkg/FR-2012-06-11/pdf/2012-14097.pdf
<i>Abstract:</i> This final rule completes the initial air quality designations for the 2008 primary and secondary NAAQS for ozone.		
1/22/15	Information on the Interstate Transport “Good Neighbor” Provision for the 2008 Ozone National Ambient Air Quality Standards (NAAQS) under Clean Air Act (CAA) Section 110(a)(2)(D)(i)(I)	http://www3.epa.gov/airtransport/GoodNeighborProvision2008NAAQS.pdf
<i>Abstract:</i> This memorandum is to provide information to states regarding SIPs to address the interstate transport “Good Neighbor” Provision of the CAA as it pertains to the 2008 ozone NAAQS.		
3/6/15	Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule (Final – 80 FR12264; signed 2/13/15)	http://www.gpo.gov/fdsys/pkg/FR-2015-03-06/pdf/2015-04012.pdf
<i>Abstract:</i> This final rule establishes a final rule for implementing the 2008 ozone NAAQS that were promulgated on March 12, 2008.		
7/13/15	Findings of Failure to Submit a Section 110 State Implementation Plan for Interstate Transport for the 2008 National Ambient Air Quality Standards for Ozone (Final Rule – 80 FR 3991; Signed 6/30/15)	http://www.gpo.gov/fdsys/pkg/FR-2015-07-13/pdf/2015-16922.pdf
<i>Abstract:</i> This final rule finds that 24 states have failed to submit infrastructure State Implementation Plans (SIPs) to satisfy certain interstate transport requirements of the Clean Air Act (CAA) with respect to the 2008 8-hour ozone national ambient air quality standard (NAAQS). Specifically, these requirements pertain to significant contribution to nonattainment, or interference with maintenance, of the 2008 8-hour ozone NAAQS in other states. These findings of failure to submit establish a 2-year deadline for the EPA to promulgate a Federal Implementation Plan (FIP) to address the interstate transport SIP requirements pertaining to significant contribution to nonattainment and interference with maintenance unless, prior to the EPA promulgating a FIP, the state submits, and the EPA approves, a SIP that meets these requirements.		
8/4/15	Notice of Availability of the Environmental Protection Agency’s Updated Ozone Transport Modeling Data for the 2008 Ozone National Ambient Air Quality Standard (NAAQS) (NOA – 80 FR 46271; 7/23/15)	http://www.gpo.gov/fdsys/pkg/FR-2015-08-04/pdf/2015-18878.pdf
<i>Abstract:</i> This notice provides notice that interstate ozone transport modeling and associated data and methods are available for public review and comment. These data and methods will be used to inform a rulemaking proposal that the EPA is developing and expects to release later this year to address interstate ozone transport for the 2008 ozone NAAQS. This notice also meets the EPA’s expressed		

intent to update the air quality modeling data that were released on 1/22/15, and to share the updated data with states and other stakeholders.

10/1/15 Implementing the 2015 Ozone National Ambient Air Quality Standards <http://www3.epa.gov/ozonepollution/pdfs/20151001memo.pdf>

Abstract: This document highlights many of the issues related to implementing the revised national ozone standards, including policy and technical aspects of implementation that EPA anticipates facing in the coming years. It also outlines actions that the EPA will take and our expectations of our air agency partners.

12/3/15 Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS (NPRM Rule – 80 FR 75706; Signed 11/16/15) <https://www.gpo.gov/fdsys/pkg/FR-2015-12-03/pdf/2015-29796.pdf>

Abstract: This rule proposes an update to the Cross-State Air Pollution Rule (CSAPR) FIPs for the 2008 ozone National Ambient Air Quality Standards (NAAQS). Starting in 2017, this proposal would reduce summertime nitrogen oxides (NO_x) emissions from power plants in 23 states in the eastern U.S.

2/25/16 Area Designations for the 2015 Ozone National Ambient Air Quality Standards <https://www.gpo.gov/fdsys/pkg/FR-2016-03-01/pdf/2016-04468.pdf>

Abstract: This guidance provides information on the schedule and process for initially designating areas for the purpose of implementing the 2015 primary and secondary ozone NAAQS.

3/__/16 Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Several Areas Classified As Marginal for the 2008 Ozone National Ambient Air Quality Standards (Final – publication to be determined; Signed 3/__/16)

Abstract: This rule takes final action on three separate and independent types of determinations for each of the 36 areas that are currently classified as “Marginal” for the 2008 ozone NAAQS. First, the EPA is determining that 17 areas attained the 2008 ozone NAAQS by the applicable attainment date of July 20, 2015, based on complete, quality-assured and certified ozone monitoring data for 2012-2014. Second, the EPA is granting 1-year attainment date extensions for eight areas on the basis that the requirements for such extensions under the CAA and the EPA’s implementing regulations have been met. Third, the EPA is determining that 11 areas failed to attain the 2008 ozone NAAQS by the applicable attainment date of July 20, 2015, and thus are reclassified by operation of law as “Moderate” for the 2008 ozone NAAQS. States containing any or any portion of these new Moderate areas must submit SIP revisions that meet the statutory and regulatory requirements that apply to 2008 ozone nonattainment areas classified as Moderate by January 1, 2017.

Lead

11/22/10 Air Quality Designations for the 2008 Lead (Pb) National Ambient Air Quality Standards (Final – 75 FR 71033; signed 11/16/10) <http://www.gpo.gov/fdsys/pkg/FR-2010-11-22/pdf/2010-29405.pdf>

Abstract: This final rule establishes air quality designations for certain areas in the United States for the 2008 Pb NAAQS.

7/8/11 2008 Lead (Pb) National Ambient Air Quality Standards (NAAQS) <http://www3.epa.gov/airquality/lead/pdfs/20110708memo.pdf>

Implementation Questions and Answers		10708QAguidance.pdf
<i>Abstract:</i> This document addresses issues the EPA has received from the Regional Offices, states and industry. The document provides guidance and additional clarification that will be helpful for the Attainment Demonstration SIPs that were due 6/30/12, for the first round of designations and 6/30/13, for the second round of designations.		
11/22/11	Air Quality Designations for the 2008 Lead (Pb) National Ambient Air Quality Standards (Final – 76 FR 72097; signed 11/8/11)	http://www.gpo.gov/fdsys/pkg/FR-2011-11-22/pdf/2011-29460.pdf
<i>Abstract:</i> This final rule establishes air quality designations for most areas in the United States for the 2008 Pb NAAQS.		
3/2012	Implementation of the 2008 Lead National Ambient Air Quality Standards – Guide to Developing Reasonably Available Control Measures (RACM) for Controlling Lead Emissions	http://www3.epa.gov/airquality/lead/pdfs/2012ImplementationGuide.pdf
<i>Abstract:</i> In order to support the implementation of the 2008 Pb NAAQS, this document contains an analysis of air control measures for the purpose of determining what controls may constitute RACM, including RACT, for controlling lead emissions pursuant to Section 172(c)(1) of the CAA.		
8/10/12	Addendum to the 2008 Lead NAAQS Implementation Questions and Answers Signed on July 11, 2011, by Scott Mathias	http://www3.epa.gov/airquality/lead/pdfs/20120810qanda.pdf
<i>Abstract:</i> Addendum to the 2008 Lead NAAQS Implementation Questions and Answers dated 7/8/11 (above) - signed on July 11, 2011, by Scott Mathias.		
1/5/15	National Ambient Air Quality Standards for Lead (NPRM – 80 FR 278; signed 12/19/14)	http://www.gpo.gov/fdsys/pkg/FR-2015-01-05/pdf/2014-30681.pdf
<i>Abstract:</i> The EPA is proposing to retain the current standards, without revisions.		
Modeling/Monitoring		
12/21/10	Methods for Measurement of Filterable PM ₁₀ and PM _{2.5} and Measurement of Condensable PM Emissions From Stationary Sources; Final Rule (Final Rule – 75 FR 80118; signed 12/1/10)	http://origin.www.gpo.gov/fdsys/pkg/FR-2010-12-21/pdf/2010-30847.pdf
<i>Abstract:</i> This final rule promulgates amendments to Methods 201A and 202.		
6/2012	Near-Road NO ₂ Monitoring Technical Assistance Document	http://www3.epa.gov/ttnamti1/files/nearroad/NearRoadTAD.pdf
<i>Abstract:</i> This document is the June 2012 release of the Near-Road NO ₂ Monitoring TAD. The TAD was developed to aid state and local air monitoring agencies in the implementation of required near-road NO ₂ monitoring stations.		
3/14/13	Revision to Ambient Nitrogen Dioxide Monitoring Requirements (Final Rule – 78 FR 16184; signed 3/7/13)	http://www.gpo.gov/fdsys/pkg/FR-2013-03-14/pdf/2013-05939.pdf

<p><i>Abstract:</i> This final rule revises the deadlines established in the NAAQS for NO₂ for the near-road component of the NO₂ monitoring network in order to implement a phased deployment approach. This approach will create a series of deadlines that will make the near-road NO₂ network operational between 1/1/14, and 1/1/17. The EPA is also finalizing revisions to the approval authority for annual monitoring network plans for NO₂ monitoring.</p>		
12/21/13	Draft SO ₂ Modeling Technical Assistance Document	http://www3.epa.gov/airquality/sulfurdioxide/pdfs/SO2ModelingTAD.pdf
<p><i>Abstract:</i> This draft document is provided by the EPA to assist state, local, and tribal air agencies in the characterization of ambient air quality in areas with significant SO₂ emission sources either through ambient monitoring or dispersion modeling as outlined in the expected data requirements rule. Revised January 2014.</p>		
12/2013	Draft Source-Oriented SO ₂ Monitoring TAD	http://www3.epa.gov/airquality/sulfurdioxide/pdfs/SO2MonitoringTAD.pdf
<p><i>Abstract:</i> The primary purpose of this draft Source-Oriented SO₂ Monitoring TAD is to provide suggestions on how air agencies might appropriately and sufficiently monitor ambient air in proximity to an SO₂ emission source to create ambient monitoring data for comparison to the SO₂ NAAQS. Revised January 2014.</p>		
4/16/14	Enhancements, “bug fixes” and other modifications to AERMOD Dispersion Model	http://www3.epa.gov/ttn/scram/models/aermod/AERMOD_MCB10_table.pdf
<p><i>Abstract:</i> MCB 10 AERMOD version 14134 changes by change type.</p>		
9/30/14	Guidance Memorandum: Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO ₂ National Ambient Air Quality Standard	http://www3.epa.gov/scram001/guidance/clarification/NO2_Clarification_Memo-20140930.pdf
<p><i>Abstract:</i> This guidance addresses NSR/PSD modeling compliance demonstrations for NO₂ NAAQS and the approval and use of the new Tier 2 Ambient Ratio Method 2 (ARM2) and various aspects of the application of the Tier 3 approaches of OLM and PVMRM.</p>		
12/3/14	Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM _{2.5} , and Regional Haze	http://www3.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf
<p><i>Abstract:</i> The EPA is providing a draft revised version of Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM_{2.5} and Regional Haze to the state and local agencies as well as the public for consideration review and comment. Comments are due 3/13/15.</p>		
7/29/15	Revision to the Guideline on Air Quality Models: Enhancements to the AERMOD Dispersion Modeling System and Incorporation of Approaches To Address Ozone and Fine Particulate Matter; Proposed Rule	http://www.gpo.gov/fdsys/pkg/FR-2015-07-29/pdf/2015-18075.pdf
<p><i>Abstract:</i> This proposal proposes to revise the <i>Guideline on Air Quality Models</i> (“<i>Guideline</i>”). The <i>Guideline</i> has been incorporated into EPA’s regulations, satisfying a requirement under the CAA section 165(e)(3) for the EPA to specify, with reasonable particularity</p>		

models to be used in the PSD program.

PSD, NNSR and Title V Permitting

3/23/10 Modeling Procedures for Demonstrating Compliance with PM_{2.5} NAAQS <http://www2.epa.gov/sites/production/files/2015-07/documents/pm25memo.pdf>

Abstract: This memorandum addresses the need for recommendations regarding appropriate dispersion modeling procedures which can be used to demonstrate compliance with PM_{2.5} NAAQS.

04/01/10 Applicability of the Federal Prevention of Significant Deterioration Permit Requirements to New and Revised National Ambient Air Quality Standards http://cdn.ca9.uscourts.gov/datastore/library/2014/09/10/Sierra_Ambient.pdf

Abstract: This memorandum responds to inquiries that the EPA received from parties who are currently developing or reviewing applications for PSD permits under the CAA requesting that the OAR provide guidance on the applicability of PSD permitting requirements to a newly promulgated or revised NAAQS or standards.

6/29/10 Guidance Concerning the Implementation of the 1-hour NO₂ NAAQS for the Prevention of Significant Deterioration Program http://www.co.shasta.ca.us/docs/Resource_Management/spi-feir/1_Exhibit_D.pdf?sfvrsn=0

Abstract: This memorandum clarifies the applicability of current guidance in the Guideline on Air Quality Models for modeling NO₂ impacts in accordance with the PSD permit requirements to demonstrate compliance with the new 1-hour NO₂ standard. This guidance includes two attached memoranda addressing both guidance for the preparation and review of PSD permits with respect to the 1-hour standard and specific modeling guidance for estimating ambient NO₂ concentrations and determining compliance with the new 1-hour NO₂ standard.

11/10/10 PSD and Title V Permitting Guidance for Greenhouse Gases (Technical correction issued 3/2011) <http://www3.epa.gov/nsr/ghgdocs/ghgpermittingguidance.pdf>

Abstract: This document assists permit writers and permit applicants in addressing the prevention of significant deterioration (PSD) and title V permitting requirements for greenhouse gases (GHGs) that began to apply on January 2, 2011. This document: (1) describes, in general terms and through examples, the requirements of the PSD and title V permit regulations; (2) reiterates and emphasizes relevant past EPA guidance on the PSD and title V review processes for other regulated air pollutants; and (3) provides additional recommendations and suggested methods for meeting the permitting requirements for GHGs, which are illustrated in many cases by examples.

3/1/11 Additional Clarification Regarding Applicability of Appendix W Modeling Guidance for the 1-hour NO₂ NAAQS http://www3.epa.gov/scram001/guidance/clarification/Additional_Clarifications_Appendix_W_Hourly-NO2-NAAQS_FINAL_03-01-2011.pdf

Abstract: This memorandum supplements the 6/28/10 guidance memo by providing further clarification and guidance on the application of Appendix W guidance for the 1-hour NO₂ standard. The memo itself referenced a 6/29/10 guidance memo in error.

4/11/11	Clarification on AERSCREEN as recommended screening model	http://www3.epa.gov/scram001/guidance/clarification/20110411_AERSCREEN_Release_Memo.pdf
<i>Abstract:</i> AERSCREEN has been released and is available on the SCRAM website. AERSCREEN is based on AERMOD, EPA's preferred near-field dispersion model and replaces SCREEN3 as the recommended screening model based on the <i>Guideline on Air Quality Models</i> .		
7/21/11	Revised Policy to Address Reconsideration of Inter-pollutant Trading Provisions for Fine Particles (PM _{2.5})	http://www3.epa.gov/scram001/guidance/clarification/pm25trade.pdf
<i>Abstract:</i> The purpose of this memorandum is to announce a change in the policy that the EPA originally set forth in the 2008 PM _{2.5} NSR Implementations Rule (the 2008 final rule) concerning the development and adoption of interpollutant trading (offset) provisions for PM _{2.5} under state NNSR programs for PM _{2.5} .		
10/15/12	Timely Processing of Prevention of Significant Deterioration (PSD) Permits when EPA or a PSD-Delegated Air Agency Issues the Permit	http://www2.epa.gov/sites/production/files/2015-07/documents/timely.pdf
<i>Abstract:</i> This memorandum clarifies expectations and responsibilities regarding the processing of PSD permit applications when an EPA Regional Office or a PSD-delegated air agency issues the PSD permit.		
4/17/13	Minor New Source Review Program Public Notice Requirements under 40 CFR 51.161(b)(3)	http://www2.epa.gov/sites/production/files/2015-07/documents/pubnot.pdf
<i>Abstract:</i> The purpose of this memorandum is to clarify the Agency's position on what constitutes prominent advertisement for minor sources under our permitting regulations at 40 CFR 51.161.		
3/8/13	Use of ASOS Meteorological Data in AERMOD Dispersion Modeling	http://www3.epa.gov/scram001/guidance/clarification/20130308_Met_Data_Clarification.pdf
<i>Abstract:</i> The purpose of this memorandum is to provide some background information related to the transition to ASOS and to address more recent developments and potential issues associated with the use of NWS meteorological data for dispersion modeling.		
12/9/13	Prevention of Significant Deterioration for Particulate Matter Less Than 2.5 Micrometers – Significant Impact Levels and Significant Monitoring Concentration: Removal of Vacated Elements (Final Rule - 78 FR 73698; signed 11/26/13)	http://www.gpo.gov/fdsys/pkg/FR-2013-12-09/pdf/2013-29196.pdf
<i>Abstract:</i> On 1/22/13, the United States Court of Appeals for the District of Columbia Circuit (the Court) granted a request from the EPA to vacate and remand to the EPA portions of two PSD regulations, promulgated in 2010 under the authority of the CAA, regarding the SILs for PM _{2.5} . The Court further vacated the portions of the PSD regulations establishing a PM _{2.5} SMC. The EPA amended its regulations to remove the vacated PM _{2.5} SILs and SMC provisions from the PSD regulations in the CFR. This action was exempt from		

notice-and-comment rulemaking because it is ministerial in nature. The EPA will initiate a separate rulemaking in the future regarding the PM_{2.5} SILs that will address the Court's remand. The final rule was effective on 12/9/13.

12/16/13	AERMOD Modeling System Updates: Improvements to beta "Low wind Speed" options, updated NO ₂ tier 2 Ambient Ratio Method, added directionally varying monitored background concentrations capability, and other bug fixes.	http://www3.epa.gov/ttn/scram/models/aermod/aermod_mcb9.txt
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Abstract: Model change Bulleting (MCB) #9 documents and describes changes made to the AERMOD Dispersion Model.

1/31/14	Guidance on Extension of Prevention of Significant Determination (PSD) Permits under 40 CFR 52.21(r)(2)	http://www2.epa.gov/sites/production/files/2015-07/documents/extend14.pdf
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Abstract: The purpose of this memorandum is to clarify the EPA's views on what constitutes adequate justification for an extension of the 18-month timeframe for commencing construction of a source that has been granted a preconstruction permit under the PSD provisions of part C of title I of the CAA.

4/8/14	Interim Guidance on the Treatment of Condensable Particulate Matter Test Results in the Prevention of Significant Deterioration and Nonattainment New Source Review Permitting Programs	http://www3.epa.gov/ttnemc01/methods/psdhs/rinterimcmpmemo4814.pdf
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Abstract: This memorandum provides interim guidance on the treatment of CPM under the EPA's NSR permit programs for PM.

4/30/14	Implementation Guidance on Annual Compliance Certification Reporting and Statement of Basis Requirements for Title V Operating Permits	http://www3.epa.gov/air/tribal/pdfs/Memo_OAR_14_000_8602_Guidance%20on%20Annual%20Compliance%20Cert.%20Reporting%20and%20Statement%20Title%20V.pdf
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Abstract: This memorandum and attachments provide guidance on satisfying the CAA title V annual compliance certification reporting and statement of basis requirements. It addresses two outstanding recommendations made by the OIG in the report titled, "Substantial Changes Needed in Implementation and Oversight of Title V Permits if Program Goals are to be Fully Realized," (OIG Report No. 2005-P-00010).

5/20/14	Guidance for PM _{2.5} Permit Modeling	http://www3.epa.gov/scram001/guidance/guide/Guidance_for_PM25_Permit_Modeling.pdf
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Abstract: This memorandum and attachment, titled "Guidance for PM_{2.5} Permit Modeling," provides guidance on demonstrating compliance with PM_{2.5} NAAQS and PSD increments, especially with regard to considerations of the secondarily formed component of PM_{2.5}.

7/24/14	Next Steps and Preliminary Views on the Application of Clean Air Act Permitting Programs to Greenhouse Gases Following the Supreme Court's Decision in <i>Utility Air Regulatory Group v. Environmental Protection Agency</i>	http://www3.epa.gov/nsr/documents/20140724memo.pdf
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<i>Abstract:</i> This memorandum provides guidance on how we interpret the <i>UARG v EPA</i> Supreme Court decision, especially with regard to the portion of the PSD and title V GHG permitting regulations that the Supreme Court determined was no longer required.		
9/29/14	Amendments to Compliance Certification Content Requirements for State and Federal Operating Permits Programs (Final – 79 FR 43661; signed 7/21/14)	http://www.gpo.gov/fdsys/pkg/FR-2014-07-28/pdf/2014-17680.pdf
<i>Abstract:</i> This final rule amends the compliance certification provisions to restore a sentence removed by error in a previous amendment. The June 27, 2003, final rule that amended the Compliance Certification Requirements language inadvertently omitted a sentence.		
12/19/14	Next Steps for Addressing EPA-Issued Step 2 Prevention of Significant Deterioration Greenhouse Gas Permits and Associated Requirements	http://www3.epa.gov/nsr/ghgdocs/Step2PermitRescissionMemoFinal_12-19-14.pdf#_ga=1.59215274.68043026.1426172912
<i>Abstract:</i> This memorandum addresses questions from the regional office on how to proceed on PSD permits issued by the EPA under Step 2 of the Tailoring Rule after the U.S. Supreme Court decision in <i>UARG v. EPA</i> [134 S. Ct. 2427 (2014)] and other questions related to Step 2 PSD permits issued by the EPA.		
12/19/14	No Action Assurance Regarding EPA-Issued Step 2 Prevention of Significant Deterioration Permits and Related Title V Requirements Following <i>Utility Air Regulatory Group v. Environmental Protection Agency</i>	http://www2.epa.gov/sites/production/files/2014-12/documents/oecanaamemo-121914.pdf
<i>Abstract:</i> This memorandum provided further information on how EPA intends to proceed regarding EPA-issued Step 2 PSD permits and intention to undertake a rulemaking action that will allow the agency to rescind any Step 2 PSD permits that it issued under the regulations the Supreme Court held to be invalid.		
5/7/2015	Prevention of Significant Deterioration Permitting for Greenhouse Gases; Providing Option for Rescission of EPA-Issued Tailoring Rule Step 2 Prevention of Significant Deterioration Permits (Direct Final – 80 FR 26183; Parallel Proposal – 80 FR 26210; signed 4/30/15)	http://www.gpo.gov/fdsys/pkg/FR-2015-05-07/pdf/2015-10628.pdf http://www.gpo.gov/fdsys/pkg/FR-2015-05-07/pdf/2015-10629.pdf
<i>Abstract:</i> This direct final with parallel proposal amends the federal PSD program regulations to allow for rescission of certain PSD permits issued by the EPA and delegated reviewing authorities under Step 2 of the PSD and title V Greenhouse Gas Tailoring Rule. No adverse comments were received on the proposal so the final becomes effective 7/6/15.		
5/13/2015	Title V Permit Guidance and Template for the Cross-State Air Pollution Rule	http://www3.epa.gov/crossstaterule/pdfs/CSA_PR_Title_V_Permit_Guidance.pdf
<i>Abstract:</i> This memorandum transmitted title V guidance, which includes a template, for the incorporation of the CSAPR applicable		

requirements into title V permits. Issuance of this guidance is consistent with the EPA's statements in the CSAPR preamble to assist permitting authorities in implementing CSAPR applicable requirements.

8/19/15	Prevention of Significant Deterioration and Title V Permitting for Greenhouse Gases: Removal of Certain Vacated Elements (Final – 80 FR 50199; signed 8/12/15)	http://www.gpo.gov/fdsys/pkg/FR-2015-08-19/pdf/2015-20501.pdf
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Abstract: This final rule amends its PSD and title V regulations to remove from the CFR portions of those regulations that were initially promulgated in 2010 and that the D.C. Circuit specifically identified as vacated in the 4/10/15, amended judgment, *Coalition for Responsible Regulation v. EPA*.

9/18/15	Source Determination for Certain Emission Units in the Oil and Natural Gas Sector (NPRM – 80 FR 56579; signed 8/18/15)	http://www.gpo.gov/fdsys/pkg/FR-2015-09-18/pdf/2015-21026.pdf
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Abstract: This proposal is proposing to clarify the term “adjacent” in the definitions of: (1) “building, structure, facility or installation” used to determine the “stationary source” for purposes of the Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) programs and (2) “major source” in the title V program as applied to the oil and natural gas sector.

12/29/15	Revisions to the Public Notice Provisions in Clean Air Act Permitting Programs (NPRM – 80 FR 81234; signed 12/21/15)	https://www.gpo.gov/fdsys/pkg/FR-2015-12-29/pdf/2015-32639.pdf
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Abstract: This proposal is proposing to revise the public notice rule provisions for the NSR, title V and OCS permit programs of the CAA and COA determinations for implementation of the OCS air quality regulations.

1/12/16	Clean Air Act Section 185 Fee Rates for Calendar Years 1990 – 2015
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CAA Section 185 Fee Rates

Abstract: This mem provides CAA section 185 penalty fee rates (\$/ton of ozone precursor emissions) for year from 1990 to 2015.

Other/Combination of Pollutants

8/23/10	Documentation of Future Year Ozone and Annual PM _{2.5} Design Values for Monitors in Western States
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Timin Memo (2).pdf

Abstract: The purpose of the memo is to provide projected future ozone and annual PM_{2.5} design values for monitors in the Western United States based on the air quality modeling in support of EPA's proposed CSAPR. The memo describes how the projected design values can be used to establish which monitors should be further evaluated to determine if emissions from other states will significantly contribute to nonattainment or interfere with maintenance at the sites.

12/20/11	Policy for Establishing Separate Air Quality Designations for Areas of Indian Country	http://www3.epa.gov/airquality/ozonepollution/designations/2008standards/documents/20120117indiancountry.pdf
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<i>Abstract:</i> This memorandum provides the EPA's policy regarding designating areas of Indian country separately from adjacent areas for the NAAQS.		
12/20/11	Guidance to Regions for Working with Tribes during the National Ambient Air Quality Standards (NAAQS) Designations Process	http://www3.epa.gov/airquality/ozonepollution/designations/2008standards/documents/20120117naaqsguidance.pdf
<i>Abstract:</i> This memorandum provides guidance to the EPA Regional Offices for working with federally-recognized Indian tribes regarding the CAA section 107(d) designations process for Indian country.		
6/7/12	Regional Haze: Revisions to Provisions Governing Alternatives to Source-Specific Best Available Retrofit Technology (BART) Determinations, Limited SIP Disapprovals, and Federal Implementation Plans	http://www.gpo.gov/fdsys/pkg/FR-2012-06-07/pdf/2012-13693.pdf
<i>Abstract:</i> The EPA is finalizing revisions to our rules pertaining to the regional haze program.		
10/2012	Agriculture Air Quality Conservation Measures Reference Guide for Cropping Systems and General Land Management	http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1049502.pdf
<i>Abstract:</i> The EPA and the USDA-NRCS have collaborated to develop this reference guide to provide a compilation of conservation measures for air pollutant emission reductions and/or reduction of air quality impacts from agricultural land management and cropping operations.		
4/2013	General Principles for the 5-Year Regional Haze Progress Reports for the Initial Regional Haze State Implementation Plans (Intended to Assist States and EPA Regional Offices in Development and Review of the Progress Reports)	http://www.4cleanair.org/Documents/haze_5year_4-10-13.pdf
<i>Abstract:</i> This document has been developed by the EPA for the EPA Regional Offices and states in preparing and reviewing the 5-year progress reports for the initial regional haze SIPs.		
5/10/13	Interim Guidance to Implement Requirements for the Treatment of Air Quality Monitoring Data Influenced by Exceptional Events	http://www.epa.gov/air-quality-analysis/interim-exceptional-events-guidance-documents
<i>Abstract:</i> This memorandum and its attachments clarify key provisions of the 2007 EER to respond to questions and issues that have arisen since the rule was promulgated.		
9/13/13	Guidance on Infrastructure State Implementation Plan (SIP) Elements Under CAA Sections 110(a)(1) and 110(a)(2)	http://www3.epa.gov/airquality/urbanair/sipstatus/docs/Guidance_on_Infrastructure_SIP_Elements_Multipollutant_FINAL_Sept_2013.pdf

<p><i>Abstract:</i> The purpose of this memorandum is to distribute non-binding guidance from the US EPA on the requirements of certain provisions of the CAA titled, “Guidance on Infrastructure State Implementation Plan (SIP) Elements under Clean Air Act Sections 110(a)(1) and 110(a)(2).”</p>		
12/2013	Examples of Reviewed Exceptional Events Submissions	http://www.epa.gov/air-quality-analysis/exceptional-events-submissions-table
<p><i>Abstract:</i> The exceptional events submission table provides examples of exceptional events submissions, or the decision documents responding to the demonstrations, for various cases of exceptional events that have been reviewed by EPA.</p>		
6/9/14	Withdrawal of the Prior Determination or Presumption That Compliance With the CAIR or the NO _x SIP Call Constitutes RACT or RACM for the 1997 8-Hour Ozone and 1997 Fine Particle NAAQS (Proposal – 79 FR 32892; signed 5/29/14)	https://www.cfr-ebooks.com/register/2014/jun/09/2014-13415.pdf
<p><i>Abstract:</i> The EPA is proposing to withdraw any prior determination or presumption, for the 1997 8-hour ozone NAAQS and the 1997 PM_{2.5} NAAQS, that compliance with the CAIR or the NO_x SIP Call automatically constitutes RACT or RACM for NO_x or SO₂ emission from EGU sources participating in these regional cap-and-trade programs.</p>		
11/19/14	Addressing Biogenic Carbon Dioxide Emissions from Stationary Sources	http://www3.epa.gov/climatechange/downloads/Biogenic-CO2-Emissions-Memo-111914.pdf
<p><i>Abstract:</i> The Agency is taking the next step in the development of ongoing technical work it has been doing in understanding the role biomass can play in reducing overall greenhouse gas emissions. The EPA has developed a second draft of the <i>Framework/or Assessing Biogenic CO₂ Emissions from Stationary Sources</i>, and is preparing to release it for further review. The EPA also anticipates near-term decision-making pertaining to biogenic CO₂ emissions in the context of both the CPP and the PSD program. EAs you know, the EPA also anticipates near-term decision-making pertaining to biogenic CO₂ emissions in the context of both the CPP and the PSD program. As a result, we expect that many states and stakeholders will look to the second draft of the Framework for indications of how the Agency will treat biogenic CO₂ emissions under both the CPP and the PSD program going forward. In addition to advising you of the release of the revised Framework, this memo also describes below OAR's current thinking with respect to those two programs and their treatment of biogenic CO₂ emissions. The EPA expects that many states and stakeholders will look to the second draft of the Framework for indications of how the Agency will treat biogenic CO₂ emissions under both the CPP and the PSD program going forward. This memo also describes below OAR's current thinking with respect to those two programs and their treatment of biogenic CO₂ emissions.</p>		
12/2014	Exceptional Events Quick Reference Guide	http://www.epa.gov/air-quality-analysis/exceptional-events-requirements-reference-guide
<p><i>Abstract:</i> The quick reference guide table contains links to information for use in preparing exceptional events demonstrations. Each link points to a specific area in guidance documents, example approved demonstrations or other relevant tools categorized by rule element, event type and pollutant.</p>		

2/10/15	Revisions to the Clean Air Act Section 110 Submission Requirements for State Implementation Plans and Notice of Availability of an Option for Electronic Reporting (Final – 80 FR 7336; signed 2/2/15)	http://www.gpo.gov/fdsys/pkg/FR-2015-02-10/pdf/2015-02602.pdf
Abstract: This final rule and notice of availability revises the requirements for how state and tribal implementation plans under the CAA are required to be submitted to the EPA.		
6/12/15	State Implementation Plan: Response to Petition for Rulemaking Restatement and Update of EPA’s SSM Policy Applicable to SIPs; Findings of Substantial Inadequacy; and SIP Calls to Amend Provisions Applying to Excess Emissions During Periods of Startup, Shutdown and Malfunction; Final Rule (Final – 80 FR 33840; signed 5/22/15)	http://www.gpo.gov/fdsys/pkg/FR-2015-06-12/pdf/2015-12905.pdf
Abstract: This final rule takes action on a petition for rulemaking filed by the Sierra Club that concerns how provisions in EPA-approved SIPs treat excess emissions during SSM. Further EPA is clarifying, restating and revising its guidance concerning its interpretation of the CAA requirements with respect to treatment in SIPs of excess emissions that occur during periods of SSM.		
8/19/15	Amendments to Regional Consistency Regulations (NPRM – 80 FR 50250; signed 8/5/15)	http://www.gpo.gov/fdsys/pkg/FR-2015-08-19/pdf/2015-20506.pdf
Abstract: This proposal proposes to revise its Regional Consistency regulations to ensure the EPA has the flexibility necessary to implement CAA programs on a national scale while addressing court rulings that concern certain agency actions under the CAA.		
9/2015	Best Communication Practices for Preparation of Exceptional Events Demonstrations	http://www.epa.gov/sites/production/files/2015-09/documents/bestpractices-exceptionaleventdemonstrationsjuly242015.pdf
Abstract: This document summarizes the best practices for communication and collaboration between the EPA and air agencies during the identification of exceptional events and the development, submittal and review of exceptional events demonstrations.		
10/22/15	Initial Clean Power Plan Submittals under Section 111(d) of the Clean Air Act	http://www3.epa.gov/airquality/cpptoolbox/cpp-initial-subm-memo.pdf
Abstract: This memorandum provides assistance and information to states interested in seeking an extension of time in which to develop and submit a final plan under section 111(d) of the CAA.		
11/20/15	Treatment of Data Influenced by Exceptional Events – Rule Revisions and Notice of Availability for Related Draft Guidance (NPRM – 80 FR 72840; signed 11/10/15)	http://www2.epa.gov/air-quality-analysis/proposed-exceptional-events-rule-revisions-and-draft-guidance-0

Abstract: This proposal proposes to revise certain sections within the March 22, 2007, 2007 Exceptional Events Rule that governs the exclusion of event-affected air quality data from regulatory decisions. The EPA is also providing a notice of availability of a draft version of the non-binding guidance document titled, *Draft Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations*.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

AUG 23 2010

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

Subject: Documentation of Future Year Ozone and Annual PM_{2.5} Design Values for Monitors in Western States

From:  Brian Timin, EPA Office of Air Quality Planning and Standards

The purpose of this memo is to provide projected future year ozone and annual PM_{2.5} design values for monitors in the Western United States based on the air quality modeling in support of EPA's recently proposed Federal Implementation Plans to Reduce Interstate Transport of Particulate Matter and Ozone (Transport Rule).¹ The memo further describes how these projected design values can be used to establish which monitors should be further evaluated to determine if emissions from other states significantly contribute to nonattainment or interfere with maintenance at these sites.

The proposed Transport Rule addresses actions that States must take in order to eliminate transport of emissions that significantly contribute to nonattainment or interfere with maintenance of the 1997 8-hour ozone and 1997 PM_{2.5} National Ambient Air Quality Standards (NAAQS), as well as the 2006 PM_{2.5} NAAQS, in other states. The air quality modeling EPA used in support of the Transport Rule is documented in the "Air Quality Modeling Technical Support Document: Transport Rule Proposal" (hereafter referred to as the "TSD"). The document can be found at <http://www.epa.gov/airquality/transport/tech.html>.

The transport rule modeling specifically evaluated eastern States' contribution to nonattainment or interference with maintenance to areas in other States. The transport rule did not evaluate the contribution to nonattainment or the interference with maintenance of states in the western portion of the continental United States. These western States were, however, included in the Transport Rule modeling domain. Therefore, the modeling results from the

¹ The Transport Rule webpage can be found here: <http://www.epa.gov/airtransport> The Transport Rule NPR Federal Register notice can be found here: 75 FR 45,210 (Aug. 2, 2010)

western portion of the modeling domain can be used to project future air quality at monitors in these western States.

The Transport Rule modeling TSD contains detailed information on the model setup, emissions, meteorology, and model results for the Transport Rule modeling. The air quality model used for the Transport Rule was the CAMx photochemical model (<http://camx.com/>). EPA performed air quality modeling for a 2005 base year and a 2012 “no CAIR” base case.² The modeling for 2005 was used as the base year for projecting air quality at monitors to the future. The 2012 base case modeling was used to identify future nonattainment and maintenance monitor locations and to quantify the contributions of emissions from sources in upwind states to concentrations of PM_{2.5}, and 8-hour ozone at downwind monitoring receptors.

The CAMx modeling was completed using a 36 km Continental U.S. modeling domain and a nested 12 km Eastern U.S. domain. Figure 1 shows the location of the domain boundaries and Table 2 provides details on the horizontal and vertical grid specifications. Additional details on model setup and performance can be found in the TSD.

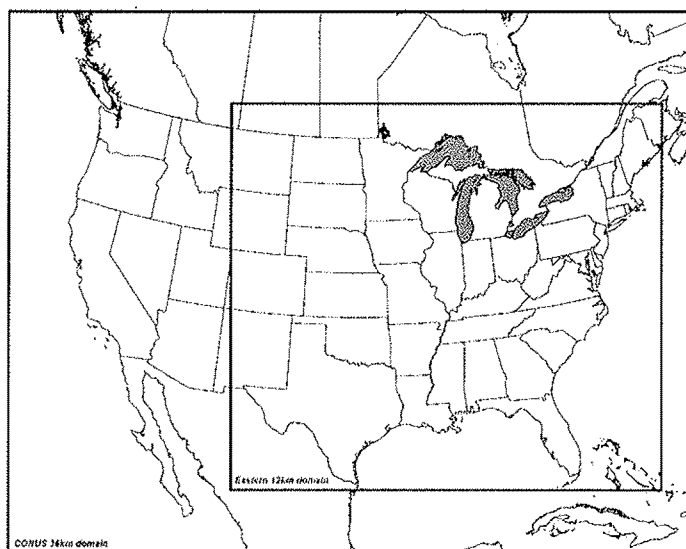


Figure 1. Transport Rule air quality modeling domains.

² In support of the Transport Rule, EPA performed additional modeling for a 2014 “no CAIR” base case, and a 2014 control case that reflects the emissions reductions expected from the Transport Rule emissions budgets (i.e., the “remedy” scenario). EPA used the 2014 remedy case modeling as part of the analysis to quantify the air quality and health benefits from the rule.

Table 1. Specifications of the air quality modeling domains.

	36 x 36 km Domain	12 x 12 km Domain
Map Projection	Lambert Conformal Projection	
Grid Resolution	36 km	12 km
Coordinate Center	97 deg W, 40 deg N	
True Latitudes	33 deg N and 45 deg N	
Dimensions	148 x 112 x 14	279 x 240 x 14
Vertical extent	14 Layers: Surface to 100 millibar level (see Table II-3)	

EPA analyzed out-of-state contributions to monitors projected to show nonattainment and maintenance problems in 2012 for the 38 States that were fully contained in the 12 km Eastern U.S. domain. In the Transport Rule, EPA made no specific findings for Western States, including those that were not fully contained within the Eastern U.S. 12 km domain.³ The modeling TSD contains information on the future year design value projection methodology (Section III) as well as the projected ozone and PM_{2.5} design values for each monitoring site in the 12 km modeling domain (Appendix B).

The future year projection methodology used the CAMx air quality modeling results in a “relative” sense to project future concentrations of ozone and PM_{2.5} at monitors. Rather than use the absolute model-predicted future year ozone and PM_{2.5} concentrations, EPA used the base year and future year predictions to calculate a (relative) percent change in ozone and PM_{2.5} concentrations. In this approach, the ratio of future year model predictions to base year model predictions are used to adjust ambient measured data up or down depending on the relative (percent) change in model predictions for each location. The use of ambient data as part of the calculation helps to constrain the future year design value predictions, even if the absolute model concentrations are over-predicted or under-predicted. In other words, anchoring the future predictions to monitored values in the base case, helps to mitigate model performance issues. As described in the TSD, the procedures for projecting PM_{2.5} and 8-hour ozone concentrations conform to the methodologies contained in the modeling guidance for attainment demonstration modeling⁴.

Nonattainment and Maintenance Receptors

³ EPA did not conduct a contribution analysis or make any specific findings for New Mexico, Colorado, Wyoming, and Montana since they are only partially contained within the 12km modeling domain.

⁴ U.S. EPA, 2007: Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, PM_{2.5}, and Regional Haze; Office of Air Quality Planning and Standards, Research Triangle Park, NC. <http://www.epa.gov/ttn/scram/guidance/guide/final-03-pm-rh-guidance.pdf>

The Transport Rule proposal identifies states whose emissions contribute significantly to nonattainment and/or interfere with maintenance of the 1997 ozone and PM_{2.5} NAAQS in other states. In order to make these findings, EPA needed to address how to define “nonattainment” and “maintenance” and to identify the monitors that would be suitable for evaluation. For the Transport Rule proposal, EPA defined nonattainment and maintenance as follows:

Design values of ozone and PM_{2.5} in 2012 were estimated by applying the 2005 to 2012 relative change in model-predicted ozone or PM_{2.5} species⁵ concentrations to the measured (2003-2007) ozone or PM_{2.5} species concentrations. For each ozone or PM_{2.5} monitoring site, all valid design values (up to 3) from this period were averaged together. Because 2005 is included in all three design value periods, this has the effect of creating a 5-year weighted average, where the middle year is weighted 3 times, the 2nd and 4th years are weighted twice, and the 1st and 5th years are weighted once. EPA referred to this as the “5-year weighted average” concentration (or 5-year weighted average design value).

EPA then used the 5-year weighted average design values to project ambient concentrations for the 2012 scenario in order to determine which monitoring sites are expected to be nonattainment for the future year scenario. We also projected 2012 design values for each of the individual 3-year design value periods (i.e., 2003-2005, 2004-2006, and 2005-2007). The projection of design values for these individual three year periods was used to determine sites expected to have maintenance problems in the 2012 base case.

For annual average PM_{2.5} concentrations, any value that is greater than or equal to 15.05 µg/m³ is rounded to 15.1 µg/m³ and is considered to be violating the NAAQS. This approach is consistent with the truncation and rounding procedures for the 1997 annual PM_{2.5} NAAQS. Thus, monitor sites with future year annual PM_{2.5} design values of 15.05 µg/m³ or greater, based on the projection of 5-year weighted average concentrations, are predicted to be nonattainment sites. Sites with future year maximum design values (based on the highest of the three design values projected to 2012, as described above) of 15.05 µg/m³ or greater are predicted to be maintenance sites. We use the term “nonattainment sites” to refer to those sites that are projected to exceed the NAAQS based on both the average and maximum design values. Those sites that are projected to be attainment based on the average design value but exceed the NAAQS based on the maximum design value are referred to as maintenance sites.

The future year ozone design values are truncated to integers⁶ in units of ppb. This approach is consistent with the truncation and rounding procedures for the 1997 8-hour ozone NAAQS. Future year design values that are greater than or equal to 85 ppb are considered to be violating the NAAQS. Sites with future year 5-year weighted average ozone design values of 85

⁵ The PM_{2.5} species include sulfate, nitrate, ammonium, particle bound water, elemental carbon, salt, other primary PM_{2.5}, and organic aerosol mass (by difference). Organic aerosol mass by difference is defined as the difference between FRM PM_{2.5} and the sum of the other components.

⁶ The documented ozone design values include values to the tenths digit. Therefore, based on truncation to an integer, any value that is less than or equal to 84.9 ppb is < 85 ppb. Any value that is greater than or equal to 85.0 ppb is violating the NAAQS.

ppb or greater are predicted to be nonattainment. Sites with future year maximum design values of 85 ppb or greater are predicted to be future year maintenance sites.

2012 Model Results for the West

We have used the approach of the proposed Transport Rule to identify monitors in the West that are projected to show nonattainment or maintenance problems in 2012. EPA did not evaluate the contribution of the western states to other states in the proposed Transport Rule. However, as shown in Figure 1, the western states are within the scope of the 36 km modeling domain. Therefore, future year projected design values for western states can be calculated from the modeling. Using the same approach as used in the transport rule, we are able to evaluate whether monitors in these western states should be considered maintenance receptors for purposes of other section 110(a)(2)(D) actions.

Appendix A and B contain the model projected 2012 design values for 8-hour ozone and annual average PM_{2.5} for the West. This includes design values for the States of Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Idaho, Washington, Oregon, Nevada, and California. The 2012 design values for the rest of the continental U.S. is documented in Appendix B of the Transport Rule Air Quality Modeling TSD.

Appendix A contains projected 2012 annual PM_{2.5} (1997 NAAQS) design values based on the average ambient design values and the maximum ambient design values. Appendix B contains projected 2012 8-hour ozone (1997 NAAQS) design values based on the average ambient design values and the maximum ambient design value. As noted above, sites with 2012 average design values above the NAAQS are considered nonattainment sites. Sites with 2012 maximum design values above the NAAQS are considered maintenance sites.

Additional ozone information is included in Appendix C. Appendix C contains design value information for ozone monitoring sites in the West where 2012 projected design values could not be calculated from the Transport Rule modeling results. This was due to a limited number of “high” modeled ozone days. The Transport Rule ozone design value projection methodology followed the recommended procedure from the ozone modeling guidance. In order to calculate a valid future year design value, the relative change in modeled ozone must be based on the average of at least 5 modeled days with base year concentrations of ≥ 70 ppb. No future year design values were calculated for sites which did not meet this criteria. Consistent with the modeling guidance and the Transport Rule, future year ozone design values were not calculated for sites which did not meet the minimum data requirements. Appendix C contains the sites which have valid base year design value data (at least one complete design value in the 2003-2007 period), but no valid 2012 projected design value.

Note: There are numerous monitoring sites in the States of New Mexico, Colorado, Wyoming, and Montana which are in both the 36 km and 12 km CAMx modeling domains. Only the 12km results for these sites are included in Appendix A and B. The appendices note where the design values were extracted from the 12 km model results.

Appendix A

**Base year 2003-2007 and Future Year 2012 Annual Average PM2.5
Design Values- Western States**

Monitor ID	State	County	Monitor Latitude	Monitor Longitude	Average Design Value 2003-2007 (ug/m3)	Maximum Design Value 2003-2007 (ug/m3)	Average Design Value 2012 (ug/m3)	Maximum Design Value 2012 (ug/m3)	Modeling results from 12km domain?
40031005	Arizona	Cochise	31.3492	-109.5397	7	7.06	6.9	6.97	
40051008	Arizona	Coconino	35.20611	-111.6528	6.49	6.87	6.28	6.64	
40070008	Arizona	Gila	34.22934	-111.3294	8.94	8.98	8.65	8.68	
40130019	Arizona	Maricopa	33.48385	-112.1426	12.17	12.54	11.43	11.78	
40134003	Arizona	Maricopa	33.40316	-112.0753	12.59	12.59	11.92	11.92	
40139997	Arizona	Maricopa	33.50383	-112.0958	9.97	10.23	9.35	9.6	
40190011	Arizona	Pima	32.32255	-111.0377	6.04	6.18	5.77	5.9	
40191028	Arizona	Pima	32.29515	-110.9823	5.85	6	5.59	5.73	
40210001	Arizona	Pinal	32.87758	-111.7522	7.77	8.37	7.49	8.06	
40213002	Arizona	Pinal	33.42119	-111.5032	5.71	5.92	5.45	5.66	
40230004	Arizona	Santa Cruz	31.3372	-110.9367	12.94	13.69	12.7	13.43	
60010007	California	Alameda	37.6875	-121.7842	9.44	9.67	9.6	9.83	
60011001	California	Alameda	37.5358	-121.9619	9.34	9.6	9.87	10.15	
60070002	California	Butte	39.7575	-121.8422	12.73	13.51	11.92	12.65	
60090001	California	Calaveras	38.20194	-120.6806	7.77	7.82	7.3	7.33	
60111002	California	Colusa	39.20306	-122.0167	7.39	7.39	7.13	7.14	
60130002	California	Contra Costa	37.936	-122.0262	9.47	9.8	9.62	9.95	
60190008	California	Fresno	36.78139	-119.7722	16.99	17.44	15.46	15.86	
60195001	California	Fresno	36.81917	-119.7164	16.38	16.4	14.91	14.93	
60195025	California	Fresno	36.72708	-119.7321	17.17	17.23	15.64	15.68	
60250005	California	Imperial	32.67611	-115.4833	12.71	12.9	12.18	12.36	
60250007	California	Imperial	32.97835	-115.5383	8.39	8.61	8.12	8.33	
60251003	California	Imperial	32.79167	-115.5617	9.2	9.43	8.92	9.14	
60271003	California	Inyo	36.48778	-117.8706	5.25	5.52	4.98	5.22	
60290010	California	Kern	35.38556	-119.0147	18.94	19.21	16.86	17.11	
60290014	California	Kern	35.35611	-119.0403	18.68	19.56	16.6	17.37	
60290016	California	Kern	35.32472	-118.9992	19.17	20.31	17.1	18.11	
60310004	California	Kings	36.10139	-119.5658	17.28	17.56	15.59	15.83	
60333001	California	Lake	39.03139	-122.9222	4.62	4.81	4.59	4.78	
60370002	California	Los Angeles	34.1365	-117.9239	17.03	18.19	15.86	16.94	
60371002	California	Los Angeles	34.17605	-118.3171	18.19	19.68	16.87	18.25	
60371103	California	Los Angeles	34.06659	-118.2269	18	19.61	16.66	18.14	
60371201	California	Los Angeles	34.19925	-118.5328	15.35	15.35	14.52	14.52	
60371301	California	Los Angeles	33.92899	-118.2107	17.66	18.73	16.54	17.54	
60371602	California	Los Angeles	34.01194	-118.0700	17.92	19.17	16.77	17.93	
60372005	California	Los Angeles	34.1326	-118.1272	15.36	16.78	14.28	15.6	
60374002	California	Los Angeles	33.82376	-118.1892	16.62	17.27	15.59	16.19	
60374004	California	Los Angeles	33.79236	-118.1753	15.21	15.21	14.29	14.29	
60379033	California	Los Angeles	34.67139	-118.1306	8.42	8.91	7.81	8.26	
60450006	California	Mendocino	39.15056	-123.2050	6.46	6.83	6.28	6.64	
60472510	California	Merced	37.30917	-120.4806	14.78	14.96	13.69	13.85	
60531003	California	Monterey	36.69683	-121.6362	6.96	7.01	6.88	6.93	
60570005	California	Nevada	39.23444	-121.0556	5.16	5.25	4.84	4.94	

Monitor ID	State	County	Monitor Latitude	Monitor Longitude	Average Design Value 2003-2007 (ug/m3)	Maximum Design Value 2003-2007 (ug/m3)	Average Design Value 2012 (ug/m3)	Maximum Design Value 2012 (ug/m3)	Modeling results from 12km domain?
60571001	California	Nevada	39.33861	-120.1703	6.71	7.06	6.26	6.58	
60590007	California	Orange	33.83062	-117.9385	15.75	16.32	14.73	15.26	
60592022	California	Orange	33.63003	-117.6759	11.33	11.9	10.81	11.35	
60610006	California	Placer	38.74583	-121.2653	9.8	9.98	9.31	9.48	
60631006	California	Plumas	39.93722	-120.9378	9.75	9.75	9.22	9.22	
60631009	California	Plumas	39.80833	-120.4717	11.46	11.84	10.75	11.1	
60651003	California	Riverside	33.94603	-117.4006	18.91	20.45	17.73	19.18	
60652002	California	Riverside	33.70853	-116.2154	10.31	10.85	9.85	10.37	
60658001	California	Riverside	33.99958	-117.4160	20.95	22.6	19.64	21.19	
60670006	California	Sacramento	38.61417	-121.3669	11.88	12.02	11.28	11.42	
60670010	California	Sacramento	38.55833	-121.4919	11.44	11.57	10.92	11.06	
60674001	California	Sacramento	38.55583	-121.4572	10.53	10.54	10.04	10.04	
60710025	California	San Bernardino	34.03722	-117.6900	19.67	21.15	18.41	19.8	
60710306	California	San Bernardino	34.51	-117.3306	10.29	10.7	9.58	9.96	
60712002	California	San Bernardino	34.10002	-117.4920	19.14	20.28	17.96	19.03	
60718001	California	San Bernardino	34.26444	-116.8644	10.77	10.77	10.25	10.25	
60719004	California	San Bernardino	34.10688	-117.2741	19.01	20.45	17.84	19.19	
60730001	California	San Diego	32.63123	-117.0591	11.92	12.16	11.61	11.84	
60730003	California	San Diego	32.79119	-116.9421	12.27	12.82	11.95	12.48	
60730006	California	San Diego	32.83646	-117.1287	10.59	10.69	10.31	10.42	
60731002	California	San Diego	33.12771	-117.0753	12.79	13.45	12.62	13.27	
60731010	California	San Diego	32.70149	-117.1497	13.38	13.85	13.04	13.5	
60750005	California	San Francisco	37.766	-122.3991	9.62	9.87	10.08	10.34	
60771002	California	San Joaquin	37.95083	-121.2675	12.94	13.08	12.52	12.66	
60792006	California	San Luis Obispo	35.25661	-120.6689	6.92	7.02	6.78	6.89	
60798001	California	San Luis Obispo	35.49139	-120.6681	7.94	8.01	7.63	7.7	
60811001	California	San Mateo	37.4829	-122.2034	9.03	9.22	9.53	9.73	
60830011	California	Santa Barbara	34.42778	-119.6903	10.37	10.57	10.26	10.46	
60850005	California	Santa Clara	37.3485	-121.8950	11.38	11.7	12.06	12.39	
60852003	California	Santa Clara	37.3062	-121.8489	10.32	10.32	10.42	10.42	
60890004	California	Shasta	40.54972	-122.3792	7.41	7.72	6.93	7.22	
60950004	California	Solano	38.1027	-122.2382	9.99	10.19	9.97	10.17	
60970003	California	Sonoma	38.4435	-122.7100	8.21	8.34	8.28	8.41	
60990005	California	Stanislaus	37.64167	-120.9936	14.21	14.56	13.22	13.54	
61010003	California	Sutter	39.13889	-121.6175	9.85	10.25	9.19	9.56	
61072002	California	Tulare	36.33222	-119.2903	18.51	19.32	16.75	17.48	
61110007	California	Ventura	34.21	-118.8694	10.68	11.25	10.42	10.97	
61110009	California	Ventura	34.40461	-118.8100	9.74	10.1	9.38	9.71	
61112002	California	Ventura	34.2775	-118.6847	11.68	12.63	11.15	12.05	
61113001	California	Ventura	34.255	-119.1425	10.69	11.19	10.34	10.82	
61131003	California	Yolo	38.66194	-121.7278	9.03	9.37	8.7	9.03	
80010006	Colorado	Adams	39.82601	-104.9374	10.06	10.16	9.63	9.73	Yes
80050005	Colorado	Arapahoe	39.6044	-105.0195	7.96	8.1	7.64	7.77	Yes
80130003	Colorado	Boulder	40.16458	-105.1009	8.32	8.54	7.91	8.13	Yes

Monitor ID	State	County	Monitor Latitude	Monitor Longitude	Average Design Value 2003-2007 (ug/m3)	Maximum Design Value 2003-2007 (ug/m3)	Average Design Value 2012 (ug/m3)	Maximum Design Value 2012 (ug/m3)	Modeling results from 12km domain?
80130012	Colorado	Boulder	40.0211	-105.2634	6.96	7.06	6.67	6.77	Yes
80290004	Colorado	Delta	38.73921	-108.0731	7.44	7.62	6.97	7.14	Yes
80310002	Colorado	Denver	39.75118	-104.9876	9.37	9.74	8.97	9.32	Yes
80310023	Colorado	Denver	39.78108	-104.9567	9.76	9.76	9.34	9.34	Yes
80390001	Colorado	Elbert	39.23138	-104.6348	4.4	4.54	4.23	4.37	Yes
80410008	Colorado	El Paso	38.89598	-104.7613	6.73	6.73	6.34	6.34	Yes
80410011	Colorado	El Paso	38.82804	-104.8277	7.94	8.11	7.49	7.65	Yes
80690009	Colorado	Larimer	40.57129	-105.0797	7.33	7.4	7.02	7.09	Yes
80770017	Colorado	Mesa	39.0638	-108.5612	9.28	9.48	8.78	8.97	Yes
81010012	Colorado	Pueblo	38.26306	-104.6121	7.45	7.65	7.08	7.28	Yes
81130004	Colorado	San Miguel	37.93787	-107.8131	4.65	4.81	4.48	4.64	Yes
81230006	Colorado	Weld	40.41488	-104.7069	8.19	8.35	7.73	7.89	Yes
81230008	Colorado	Weld	40.20939	-104.8241	8.78	9.28	8.31	8.77	Yes
160010011	Idaho	Ada	43.63611	-116.2703	8.41	8.51	8.09	8.2	
160050015	Idaho	Bannock	42.87673	-112.4603	7.66	7.74	7.37	7.45	
160090010	Idaho	Benewah	47.31667	-116.5703	9.59	9.69	9.37	9.47	
160270004	Idaho	Canyon	43.5624	-116.5632	8.46	8.64	7.98	8.15	
160410001	Idaho	Franklin	42.01333	-111.8092	7.7	7.7	7.24	7.24	
160490003	Idaho	Idaho	46.2094	-116.0275	9.58	9.58	9.43	9.43	
160790017	Idaho	Shoshone	47.53639	-116.2367	12.08	12.13	11.77	11.82	
300870307	Montana	Rosebud	45.62333	-106.6681	6.58	6.58	6.48	6.48	Yes
301111065	Montana	Yellowstone	45.80194	-108.4261	8.14	8.18	7.89	7.92	Yes
300131026	Montana	Cascade	47.50222	-111.2789	5.57	5.8	5.39	5.61	
300290009	Montana	Flathead	48.39972	-114.3336	9.87	10.16	9.49	9.77	
300290047	Montana	Flathead	48.2025	-114.3056	8.46	8.55	8.09	8.18	
300310013	Montana	Gallatin	44.65778	-111.0908	4.25	4.31	4.17	4.22	
300470013	Montana	Lake	47.52694	-114.1006	9.06	9.06	8.76	8.76	
300470028	Montana	Lake	47.69222	-114.1622	9	9	8.7	8.7	
300490018	Montana	Lewis and Clark	46.60389	-112.0353	7.96	8	7.7	7.76	
300530018	Montana	Lincoln	48.38417	-115.5481	14.93	15.12	14.31	14.49	
300630031	Montana	Missoula	46.87491	-113.9953	10.2	10.27	9.85	9.9	
300810007	Montana	Ravalli	46.24552	-114.1598	8.56	8.58	8.33	8.36	
300890007	Montana	Sanders	47.59639	-115.3236	6.69	6.85	6.54	6.7	
300930005	Montana	Silver Bow	46.0024	-112.5009	9.86	10.53	9.5	10.16	
320030022	Nevada	Clark	36.39078	-114.9068	4.02	4.07	3.85	3.91	
320030298	Nevada	Clark	36.05222	-115.0569	5.75	5.8	5.46	5.5	
320030561	Nevada	Clark	36.16399	-115.1139	9.44	9.44	8.84	8.84	
320031019	Nevada	Clark	35.78563	-115.3571	3.67	3.78	3.51	3.6	
320032002	Nevada	Clark	36.19111	-115.1222	8.49	8.79	7.98	8.26	
320310016	Nevada	Washoe	39.52508	-119.8077	8.11	8.15	7.59	7.64	
350010023	New Mexico	Bernalillo	35.1343	-106.5852	7.03	7.13	6.59	6.68	Yes
350010024	New Mexico	Bernalillo	35.0631	-106.5788	6.64	6.81	6.22	6.39	Yes
350050005	New Mexico	Chaves	33.39694	-104.5236	6.54	6.58	6.29	6.33	Yes

Monitor ID	State	County	Monitor Latitude	Monitor Longitude	Average Design Value 2003-2007 (ug/m3)	Maximum Design Value 2003-2007 (ug/m3)	Average Design Value 2012 (ug/m3)	Maximum Design Value 2012 (ug/m3)	Modeling results from 12km domain?
350130017	New Mexico	Dona Ana	31.79583	-106.5575	9.95	10.4	9.55	9.97	Yes
350130025	New Mexico	Dona Ana	32.32194	-106.7678	6.31	6.35	6.03	6.07	Yes
350431003	New Mexico	Sandoval	35.23806	-106.6494	5	5.02	4.69	4.71	Yes
350439011	New Mexico	Sandoval	35.5064	-106.7222	7.99	8.34	7.74	8.08	Yes
350450006	New Mexico	San Juan	36.7275	-108.2208	5.92	6.08	5.75	5.91	Yes
350490020	New Mexico	Santa Fe	35.67111	-105.9536	4.76	4.81	4.59	4.64	Yes
350171002	New Mexico	Grant	32.78444	-108.2717	5.93	5.93	5.79	5.79	
410290133	Oregon	Jackson	42.31408	-122.8792	10.32	10.66	9.94	10.27	
410291001	Oregon	Jackson	42.53611	-122.8750	5.41	5.55	5.28	5.42	
410350004	Oregon	Klamath	42.18889	-121.7225	11.2	11.37	10.69	10.86	
410390060	Oregon	Lane	44.02631	-123.0837	8.64	8.92	8.46	8.74	
410391007	Oregon	Lane	43.8345	-123.0353	6.35	6.35	6.23	6.23	
410391009	Oregon	Lane	44.0467	-123.0177	7.56	7.73	7.4	7.57	
410392013	Oregon	Lane	43.74435	-122.4805	11.93	12.37	11.6	12.03	
410510080	Oregon	Multnomah	45.49667	-122.6022	9.13	9.45	8.9	9.21	
410510246	Oregon	Multnomah	45.5613	-122.6788	8.35	8.57	8.14	8.36	
410610119	Oregon	Union	45.33897	-118.0945	8.35	8.52	8.08	8.24	
481410037	Texas	El Paso	31.76828	-106.5013	9.09	9.09	8.73	8.73	
490030003	Utah	Box Elder	41.49278	-112.0181	8.4	8.66	7.9	8.13	
490050004	Utah	Cache	41.73111	-111.8375	11.56	12.22	10.86	11.48	
490110004	Utah	Davis	40.90297	-111.8845	10.31	10.6	9.83	10.11	
490350003	Utah	Salt Lake	40.64667	-111.8497	11.68	11.94	10.93	11.17	
490351001	Utah	Salt Lake	40.70861	-112.0947	9.21	9.56	8.78	9.11	
490353006	Utah	Salt Lake	40.73639	-111.8722	11.3	11.62	10.73	11.03	
490353007	Utah	Salt Lake	40.70444	-111.9686	11.98	12.22	11.4	11.63	
490353008	Utah	Salt Lake	40.51795	-112.0231	8.33	8.68	7.86	8.19	
490490002	Utah	Utah	40.25361	-111.6631	10	10.04	9.32	9.35	
490494001	Utah	Utah	40.34139	-111.7136	10.51	10.73	9.8	9.99	
490495008	Utah	Utah	40.43028	-111.8039	8.88	9.11	8.36	8.57	
490495010	Utah	Utah	40.13639	-111.6597	8.78	8.91	8.18	8.31	
490570002	Utah	Weber	41.20639	-111.9747	11.16	11.45	10.51	10.77	
490570007	Utah	Weber	41.17972	-111.9831	9.28	9.54	8.73	8.98	
490571003	Utah	Weber	41.30368	-111.9871	9.36	9.54	8.8	8.97	
530330024	Washington	King	47.755	-122.2806	9.15	9.27	9.06	9.17	
530330057	Washington	King	47.5632	-122.3405	11.24	11.24	11.1	11.1	
530330080	Washington	King	47.56833	-122.3081	8.13	8.13	8.04	8.04	
530530029	Washington	Pierce	47.1864	-122.4517	10.55	10.78	10.45	10.68	
530611007	Washington	Snohomish	48.05556	-122.1758	9.91	10.35	9.77	10.21	
530630016	Washington	Spokane	47.66074	-117.3581	9.97	10.19	9.31	9.52	
560050877	Wyoming	Campbell	43.67694	-105.2358	6.29	6.29	6.16	6.16	Yes
560050892	Wyoming	Campbell	44.09889	-105.3428	5	5.04	4.91	4.95	Yes

Monitor ID	State	County	Monitor Latitude	Monitor Longitude	Average Design Value 2003-2007 (ug/m3)	Maximum Design Value 2003-2007 (ug/m3)	Average Design Value 2012 (ug/m3)	Maximum Design Value 2012 (ug/m3)	Modeling results from 12km domain?
560050899	Wyoming	Campbell	44.46597	-105.5517	5.37	5.49	5.25	5.37	Yes
560090819	Wyoming	Converse	43.42667	-105.3858	3.52	3.6	3.41	3.48	Yes
560131003	Wyoming	Fremont	42.84105	-108.7363	8.17	8.5	7.89	8.21	Yes
560210001	Wyoming	Laramie	41.13998	-104.8178	4.48	4.69	4.28	4.48	Yes
560330002	Wyoming	Sheridan	44.83327	-106.9646	9.7	9.84	9.41	9.54	Yes

Appendix B

**Base year 2003-2007 and Future Year 2012 8-Hour Average Ozone
Design Values- Western States**

Monitor ID	State	County	Monitor Latitude	Monitor Longitude	Average Design Value 2003-2007 (ppb)	Maximum Design Value 2003-2007 (ppb)	Average Design Value 2012 (ppb)	Maximum Design Value 2012 (ppb)	Modeling results from 12km domain?
40070010	Arizona	Gila	33.6350	-111.1090	80.3	81	71.1	71.7	
40130019	Arizona	Maricopa	33.4839	-112.1426	73.3	74	66.2	66.9	
40131004	Arizona	Maricopa	33.5603	-112.0663	82.7	83	74.7	75	
40131010	Arizona	Maricopa	33.4522	-111.7333	75.3	76	67.5	68.1	
40132001	Arizona	Maricopa	33.5694	-112.1915	76.7	79	69.3	71.4	
40132005	Arizona	Maricopa	33.7123	-111.8527	77	78	68.3	69.2	
40133002	Arizona	Maricopa	33.4579	-112.0460	75.7	76	68.4	68.7	
40133003	Arizona	Maricopa	33.4797	-111.9172	76.7	78	69.3	70.5	
40134003	Arizona	Maricopa	33.4032	-112.0753	72.7	74	66.5	67.7	
40134004	Arizona	Maricopa	33.2990	-111.8843	75	76	68.6	69.6	
40134005	Arizona	Maricopa	33.4124	-111.9347	75.7	77	69.3	70.5	
40134008	Arizona	Maricopa	33.8217	-112.0174	79.3	80	69.8	70.4	
40134010	Arizona	Maricopa	33.6371	-112.3418	67.3	68	60.3	60.9	
40134011	Arizona	Maricopa	33.3701	-112.6207	64	65	57.1	58	
40137003	Arizona	Maricopa	33.2894	-112.1573	70	74	64.1	67.7	
40137020	Arizona	Maricopa	33.4882	-111.8557	76	76	68.7	68.7	
40137021	Arizona	Maricopa	33.5079	-111.7546	83	83	73.6	73.6	
40139508	Arizona	Maricopa	33.9828	-111.7987	82	84	72.6	74.3	
40139702	Arizona	Maricopa	33.5455	-111.6093	73	80	64.8	71	
40139704	Arizona	Maricopa	33.6110	-111.7253	82	82	72.8	72.8	
40139706	Arizona	Maricopa	33.7188	-111.6718	81.7	83	72.5	73.6	
40139997	Arizona	Maricopa	33.5037	-112.0958	74.7	76	67.5	68.7	
40213001	Arizona	Pinal	33.4214	-111.5436	72.7	76	65.2	68.1	
40213003	Arizona	Pinal	32.9544	-111.7623	71	71	64.4	64.4	
40213009	Arizona	Pinal	33.2191	-111.5611	65.3	66	58.5	59.2	
40213010	Arizona	Pinal	33.0590	-112.0469	64	66	58	59.8	
40217001	Arizona	Pinal	33.0799	-111.7401	71.3	73	64.4	65.9	
40218001	Arizona	Pinal	33.2935	-111.2856	79.3	81	69.8	71.3	
60010007	California	Alameda	37.6875	-121.7842	78.3	80	76.2	77.8	
60050002	California	Amador	38.3400	-120.7625	83	84	77.8	78.8	
60070002	California	Butte	39.7575	-121.8422	73	74	67.5	68.5	
60070007	California	Butte	39.7142	-121.6178	83.7	84	77.5	77.8	
60090001	California	Calaveras	38.2019	-120.6806	91.3	93	85.3	86.8	
60111002	California	Colusa	39.2031	-122.0167	67	67	63	63	
60130002	California	Contra Costa	37.9360	-122.0262	73.3	74	71.3	72	
60131002	California	Contra Costa	38.0106	-121.6414	72.7	73	69.3	69.5	
60133001	California	Contra Costa	38.0292	-121.9022	69.7	70	67.4	67.7	
60170010	California	El Dorado	38.7272	-120.8181	93.7	94	86.9	87.2	
60170020	California	El Dorado	38.8906	-121.0000	96	97	88.5	89.4	
60190007	California	Fresno	36.7056	-119.7414	87.7	93	79.9	84.7	

Monitor ID	State	County	Monitor Latitude	Monitor Longitude	Average Design Value 2003-2007 (ppb)	Maximum Design Value 2003-2007 (ppb)	Average Design Value 2012 (ppb)	Maximum Design Value 2012 (ppb)	Modeling results from 12km domain?
60190008	California	Fresno	36.7814	-119.7722	98.3	99	88.9	89.5	
60190242	California	Fresno	36.8414	-119.8744	96.3	98	87.1	88.6	
60194001	California	Fresno	36.5975	-119.5036	93.7	96	85.2	87.3	
60195001	California	Fresno	36.8192	-119.7164	91.3	93	82.6	84.1	
60210002	California	Glenn	39.5178	-122.1903	65.5	67	61.5	63	
60250004	California	Imperial	32.6739	-115.5031	70	72	64	65.8	
60250005	California	Imperial	32.6761	-115.4833	74.7	79	68.3	72.2	
60250006	California	Imperial	32.6778	-115.3897	76.7	79	70.1	72.2	
60251003	California	Imperial	32.7917	-115.5617	85	86	77.7	78.6	
60254003	California	Imperial	33.0325	-115.6225	83.7	87	76.6	79.7	
60254004	California	Imperial	33.2136	-115.5444	73	74	66.8	67.7	
60290007	California	Kern	35.3461	-118.8511	98.7	100	88	89.1	
60290008	California	Kern	35.0544	-119.4039	89.3	91	79.2	80.7	
60290010	California	Kern	35.3856	-119.0147	88	90	78.4	80.2	
60290011	California	Kern	35.0506	-118.1464	87	90	77.5	80.1	
60290014	California	Kern	35.3561	-119.0403	97.7	99	87.1	88.2	
60290232	California	Kern	35.4389	-119.0158	95.7	96	85.3	85.6	
60295001	California	Kern	35.2083	-118.7844	110	113	95.7	98.3	
60296001	California	Kern	35.5036	-119.2717	89	90	80.2	81.1	
60311004	California	Kings	36.3144	-119.6436	85.7	88	77	79.1	
60370002	California	Los Angeles	34.1365	-117.9239	91.7	94	88.8	91.1	
60370016	California	Los Angeles	34.1444	-117.8504	102	105	98.8	101.7	
60370113	California	Los Angeles	34.0511	-118.4564	73.7	78	70.8	74.9	
60371002	California	Los Angeles	34.1761	-118.3171	89	89	86.3	86.3	
60371103	California	Los Angeles	34.0666	-118.2269	74	76	71.7	73.7	
60371201	California	Los Angeles	34.1993	-118.5328	101.7	106	97.7	101.9	
60371701	California	Los Angeles	34.0670	-117.7514	100.3	102	103.3	105.1	
60372005	California	Los Angeles	34.1326	-118.1272	91.3	93	88.5	90.2	
60376012	California	Los Angeles	34.3834	-118.5284	114	120	103.1	108.5	
60379033	California	Los Angeles	34.6714	-118.1306	96.3	98	88.2	89.8	
60390004	California	Madera	36.8667	-120.0100	79.3	82	71.7	74.2	
60430006	California	Mariposa	37.5500	-119.8436	83.7	87	76.2	79.2	
60470003	California	Merced	37.2817	-120.4336	89.3	95	80.8	86	
60531003	California	Monterey	36.6968	-121.6362	55.7	58	52.7	54.9	
60570005	California	Nevada	39.2344	-121.0556	96.3	98	88.7	90.3	
60570007	California	Nevada	39.3167	-120.8444	85	86	78.3	79.2	
60591003	California	Orange	33.6746	-117.9257	68	73	66.1	71	
60592022	California	Orange	33.6300	-117.6759	84.3	86	79.9	81.5	
60610002	California	Placer	38.9378	-121.1039	91.3	93	84.2	85.7	
60610004	California	Placer	39.1003	-120.9528	94	97	86.7	89.4	
60610006	California	Placer	38.7458	-121.2653	88	89	82.3	83.3	
60650012	California	Riverside	33.9209	-116.8584	112.3	119	100.9	106.9	
60652002	California	Riverside	33.7085	-116.2154	91	95	82.4	86.1	

Monitor ID	State	County	Monitor Latitude	Monitor Longitude	Average Design Value 2003-2007 (ppb)	Maximum Design Value 2003-2007 (ppb)	Average Design Value 2012 (ppb)	Maximum Design Value 2012 (ppb)	Modeling results from 12km domain?
60655001	California	Riverside	33.8528	-116.5410	102.3	104	92.1	93.7	
60656001	California	Riverside	33.7894	-117.2276	98.3	100	90.3	91.9	
60658001	California	Riverside	33.9996	-117.4160	108.7	112	109.4	112.7	
60659001	California	Riverside	33.6765	-117.3310	101	104	92.8	95.6	
60659003	California	Riverside	33.6121	-114.6006	62.3	63	57	57.6	
60670002	California	Sacramento	38.7128	-121.3800	80.7	82	75.5	76.7	
60670006	California	Sacramento	38.6142	-121.3669	90.7	92	84.9	86.1	
60670010	California	Sacramento	38.5583	-121.4919	75.7	78	71.2	73.3	
60670011	California	Sacramento	38.3019	-121.4222	82.3	83	78.8	79.4	
60670012	California	Sacramento	38.6839	-121.1628	97.3	98	91	91.7	
60670013	California	Sacramento	38.6369	-121.5133	76	76	71.5	71.5	
60675003	California	Sacramento	38.4944	-121.2100	94.3	96	88.2	89.8	
60690002	California	San Benito	36.8442	-121.3611	68	68	64.3	64.3	
60690003	California	San Benito	36.4853	-121.1556	75	76	71.1	72.1	
60710001	California	San Bernardino	34.8950	-117.0236	84.7	85	76.7	77	
60710005	California	San Bernardino	34.2431	-117.2724	123.3	127	116.7	120.2	
60710012	California	San Bernardino	34.4261	-117.5631	98	100	92.7	94.6	
60710017	California	San Bernardino	34.1419	-116.0550	85	85	77.1	77.1	
60710306	California	San Bernardino	34.5100	-117.3306	91.7	94	86.8	88.9	
60711004	California	San Bernardino	34.1037	-117.6291	106.3	108	109.5	111.3	
60711234	California	San Bernardino	35.7639	-117.3961	80.7	83	72.2	74.3	
60712002	California	San Bernardino	34.1000	-117.4920	114.3	118	115	118.7	
60714001	California	San Bernardino	34.4181	-117.2847	100.7	104	95.3	98.4	
60714003	California	San Bernardino	34.0598	-117.1473	119.3	123	120	123.8	
60719002	California	San Bernardino	34.0714	-116.3906	103.7	105	93.8	95	
60719004	California	San Bernardino	34.1069	-117.2741	115.7	116	116.4	116.7	
60730001	California	San Diego	32.6312	-117.0591	66.7	68	64.3	65.5	
60730003	California	San Diego	32.7912	-116.9421	71.7	73	69.1	70.4	
60730006	California	San Diego	32.8365	-117.1287	72.3	74	69.7	71.3	
60731001	California	San Diego	32.9521	-117.2641	69	70	66.9	67.9	
60731002	California	San Diego	33.1277	-117.0753	73.3	74	68.3	69	
60731006	California	San Diego	32.8423	-116.7683	87.7	89	81.2	82.4	
60731008	California	San Diego	33.2170	-117.3962	73	76	69.1	72	
60731010	California	San Diego	32.7015	-117.1497	59.3	61	57.2	58.8	
60732007	California	San Diego	32.5522	-116.9378	63	65	60.8	62.8	
60771002	California	San Joaquin	37.9508	-121.2675	75.3	77	71.7	73.4	
60830008	California	Santa Barbara	34.4625	-120.0255	62.3	67	58.7	63.1	

Monitor ID	State	County	Monitor Latitude	Monitor Longitude	Average Design Value 2003-2007 (ppb)	Maximum Design Value 2003-2007 (ppb)	Average Design Value 2012 (ppb)	Maximum Design Value 2012 (ppb)	Modeling results from 12km domain?
60830011	California	Santa Barbara	34.4278	-119.6903	60.5	62	57	58.4	
60831014	California	Santa Barbara	34.5417	-119.7915	76	78	71.6	73.5	
60831021	California	Santa Barbara	34.4028	-119.4575	60.7	64	56.7	59.8	
60831025	California	Santa Barbara	34.4897	-120.0469	73.3	74	69.1	69.7	
60832011	California	Santa Barbara	34.4455	-119.8284	62.7	64	59.1	60.3	
60833001	California	Santa Barbara	34.6084	-120.0747	65.3	68	61.5	64.1	
60850002	California	Santa Clara	37.0000	-121.5744	70.3	71	66.5	67.2	
60851001	California	Santa Clara	37.2269	-121.9786	71	73	68.5	70.5	
60852005	California	Santa Clara	37.4019	-121.8425	59	59	56.9	56.9	
60852006	California	Santa Clara	37.0794	-121.5992	75.3	76	72.2	72.8	
60870006	California	Santa Cruz	37.0522	-122.0125	61.3	63	59.2	60.8	
60870007	California	Santa Cruz	36.9840	-121.9883	54.7	57	52.8	55	
60890004	California	Shasta	40.5497	-122.3792	78	80	70.9	72.7	
60890007	California	Shasta	40.4531	-122.2978	79.3	84	72.1	76.4	
60950005	California	Solano	38.2269	-122.0758	67.7	69	65.5	66.7	
60953003	California	Solano	38.3584	-121.9500	72.7	74	68.1	69.4	
60990005	California	Stanislaus	37.6417	-120.9936	84.7	86	78.5	79.7	
60990006	California	Stanislaus	37.4883	-120.8358	84.7	86	77.7	78.9	
61010003	California	Sutter	39.1389	-121.6175	74	74	68.4	68.4	
61010004	California	Sutter	39.2056	-121.8204	82	83	77.1	78	
61030004	California	Tehama	40.2622	-122.0928	82.7	83	75.6	75.9	
61070006	California	Tulare	36.5672	-118.7781	96	97	87.3	88.2	
61070009	California	Tulare	36.4892	-118.8269	103.7	105	94.3	95.5	
61072002	California	Tulare	36.3322	-119.2903	92	93	82.9	83.8	
61090005	California	Tuolumne	37.9817	-120.3786	80	81	74.8	75.8	
61110007	California	Ventura	34.2100	-118.8694	79	83	77.1	81	
61110009	California	Ventura	34.4046	-118.8100	84	87	75.9	78.6	
61111004	California	Ventura	34.4483	-119.2303	88.3	90	80.1	81.7	
61112002	California	Ventura	34.2775	-118.6847	89.7	91	86.2	87.4	
61112003	California	Ventura	34.2804	-119.3136	65	68	60.7	63.6	
61113001	California	Ventura	34.2550	-119.1425	63	66	57.1	59.9	
61130004	California	Yolo	38.5333	-121.7750	74	75	69.6	70.5	
61131003	California	Yolo	38.6619	-121.7278	78.7	80	74	75.2	
80013001	Colorado	Adams	39.8381	-104.9498	69	70	66.8	67.7	yes
80050002	Colorado	Arapahoe	39.5679	-104.9572	78.7	81	76	78.2	yes
80130011	Colorado	Boulder	39.9572	-105.2385	77	81	73.4	77.2	yes
80310002	Colorado	Denver	39.7512	-104.9876	56	56	54.2	54.2	yes
80310014	Colorado	Denver	39.7518	-105.0307	73	75	70.7	72.6	yes
80350004	Colorado	Douglas	39.5345	-105.0704	83	84	79.3	80.3	yes
80590002	Colorado	Jefferson	39.8003	-105.1000	76.3	79	73.9	76.6	yes
80590005	Colorado	Jefferson	39.6388	-105.1395	70.3	75	67.9	72.4	yes
80590006	Colorado	Jefferson	39.9129	-105.1886	81.7	85	78.1	81.3	yes
80590011	Colorado	Jefferson	39.7437	-105.1780	80.7	82	78.2	79.5	yes

Monitor ID	State	County	Monitor Latitude	Monitor Longitude	Average Design Value 2003-2007 (ppb)	Maximum Design Value 2003-2007 (ppb)	Average Design Value 2012 (ppb)	Maximum Design Value 2012 (ppb)	Modeling results from 12km domain?
80691004	Colorado	Larimer	40.5775	-105.0789	72.3	74	68.4	70	yes
81230009	Colorado	Weld	40.3864	-104.7374	76.7	78	72.7	73.9	yes
80410013	Colorado	El Paso	38.9583	-104.8172	73.3	74	68.8	69.5	
80410016	Colorado	El Paso	38.8531	-104.9013	73	74	68.5	69.5	
80690007	Colorado	Larimer	40.2772	-105.5450	76	78	71.3	73.2	
320030007	Nevada	Clark	36.0289	-114.9889	76	77	68.6	69.5	
320030020	Nevada	Clark	36.2453	-115.0922	78.7	79	71	71.3	
320030022	Nevada	Clark	36.3908	-114.9068	78	79	70.6	71.5	
320030043	Nevada	Clark	36.1081	-115.2536	80.3	82	72.1	73.6	
320030071	Nevada	Clark	36.1703	-115.2614	83.7	86	75.2	77.2	
320030072	Nevada	Clark	36.2247	-115.2667	83.3	84	74.8	75.4	
320030073	Nevada	Clark	36.1731	-115.3317	82.7	83	74.3	74.5	
320030075	Nevada	Clark	36.2724	-115.2382	83.7	85	75.8	77	
320030538	Nevada	Clark	36.1431	-115.0517	77.7	78	70.1	70.4	
320030601	Nevada	Clark	35.9789	-114.8442	76	76	66.8	66.8	
320031019	Nevada	Clark	35.7856	-115.3571	80.7	81	71.8	72.1	
320031021	Nevada	Clark	36.1205	-115.1300	75.3	78	68	70.4	
320032002	Nevada	Clark	36.1911	-115.1222	79.7	81	72	73.1	
350130008	New Mexico	Dona Ana	31.9306	-106.6306	70.7	72	66.9	68.1	yes
350130017	New Mexico	Dona Ana	31.7958	-106.5575	71.3	72	67.3	67.9	yes
350130021	New Mexico	Dona Ana	31.7961	-106.5839	75.3	77	71	72.7	yes
350130022	New Mexico	Dona Ana	31.7878	-106.6828	72.7	74	68.5	69.8	yes
350450009	New Mexico	San Juan	36.7422	-107.9769	69.7	72	66.4	68.6	yes
350451005	New Mexico	San Juan	36.7967	-108.4725	71.3	72	68.1	68.8	yes
350010019	New Mexico	Bernalillo	35.1073	-106.5636	72.3	73	66.1	66.8	
350010023	New Mexico	Bernalillo	35.1343	-106.5852	71	71	65	65	
350010024	New Mexico	Bernalillo	35.0631	-106.5788	72.3	73	66.1	66.8	
350010027	New Mexico	Bernalillo	35.1539	-106.6972	71.7	72	65.6	65.9	
350011013	New Mexico	Bernalillo	35.1932	-106.6138	73.7	75	67.4	68.6	
350011014	New Mexico	Bernalillo	35.2022	-106.6493	70.3	71	64.3	65	
350431003	New Mexico	Sandoval	35.2381	-106.6494	73.3	74	67.1	67.7	
350450009	New Mexico	San Juan	36.7422	-107.9769	69.7	72	66.1	68.3	
350451005	New Mexico	San Juan	36.7967	-108.4725	71.3	72	67.7	68.4	
490030003	Utah	Box Elder	41.4928	-112.0181	76	78	70.1	71.9	
490110004	Utah	Davis	40.9030	-111.8845	81.3	85	74.6	78	
490350003	Utah	Salt Lake	40.6467	-111.8497	81	83	74.9	76.7	
490352004	Utah	Salt Lake	40.7364	-112.2103	81	83	75	76.9	
490353006	Utah	Salt Lake	40.7364	-111.8722	78.3	81	71.9	74.3	
490353007	Utah	Salt Lake	40.7044	-111.9686	79	81	72.5	74.3	
490353008	Utah	Salt Lake	40.5179	-112.0231	78	80	72.1	74	
490450003	Utah	Tooele	40.5434	-112.2988	78	78	72.6	72.6	
490490002	Utah	Utah	40.2536	-111.6631	74.3	75	68.7	69.3	
490495008	Utah	Utah	40.4303	-111.8039	76	78	70.3	72.1	

Monitor ID	State	County	Monitor Latitude	Monitor Longitude	Average Design Value 2003-2007 (ppb)	Maximum Design Value 2003-2007 (ppb)	Average Design Value 2012 (ppb)	Maximum Design Value 2012 (ppb)	Modeling results from 12km domain?
490495010	Utah	Utah	40.1364	-111.6597	76.7	78	70.9	72.1	
490570007	Utah	Weber	41.1797	-111.9831	78.3	81	71.7	74.2	
490571003	Utah	Weber	41.3037	-111.9871	80.3	83	73.5	76	

Appendix C

**Base year 2003-2007 8-Hour Average Ozone Design Values-
Western State Monitors Where a Future Year Design Value Could Not Be
Calculated**

Monitor ID	State	County	Monitor Latitude	Monitor Longitude	Average Design Value 2003-2007 (ppb)	Maximum Design Value 2003-2007 (ppb)	Average Design Value 2012	Maximum Design Value 2012
40038001	Arizona	Cochise	32.1169	-109.4669	71.3	72	-9	-9
40058001	Arizona	Coconino	36.0717	-112.1531	73	74	-9	-9
40128000	Arizona	La Paz	34.2319	-113.5800	72	72	-9	-9
40190002	Arizona	Pima	32.2221	-110.9747	68.3	70	-9	-9
40190021	Arizona	Pima	32.1746	-110.7371	76	76	-9	-9
40191011	Arizona	Pima	32.2044	-110.8787	70.7	72	-9	-9
40191018	Arizona	Pima	32.4253	-111.0635	71.7	72	-9	-9
40191020	Arizona	Pima	32.0477	-110.7744	69	70	-9	-9
40191028	Arizona	Pima	32.2952	-110.9823	72	73	-9	-9
40191030	Arizona	Pima	31.8795	-110.9964	67	68	-9	-9
40191032	Arizona	Pima	32.1730	-110.9801	66	67	-9	-9
40191034	Arizona	Pima	32.3808	-111.1272	66.7	68	-9	-9
40213007	Arizona	Pinal	32.5083	-111.3081	71.3	72	-9	-9
40250005	Arizona	Yavapai	34.4289	-112.9619	72	72	-9	-9
40270006	Arizona	Yuma	32.6779	-114.4759	75	76	-9	-9
60010005	California	Alameda	37.7994	-122.2667	39	39	-9	-9
60010006	California	Alameda	37.7078	-122.1203	52.3	53	-9	-9
60011001	California	Alameda	37.5358	-121.9619	59.3	60	-9	-9
60131004	California	Contra Costa	37.9603	-122.3567	49	52	-9	-9
60270101	California	Inyo	36.5086	-116.8478	82.3	84	-9	-9
60333001	California	Lake	39.0314	-122.9222	60.7	61	-9	-9
60371301	California	Los Angeles	33.9290	-118.2107	62	64	-9	-9
60371602	California	Los Angeles	34.0119	-118.0700	70	70	-9	-9
60374002	California	Los Angeles	33.8238	-118.1892	60.7	64	-9	-9
60375005	California	Los Angeles	33.9508	-118.4304	69	72	-9	-9
60410001	California	Marin	37.9725	-122.5186	49.7	51	-9	-9
60430003	California	Mariposa	37.7133	-119.7039	86.3	88	-9	-9
60450008	California	Mendocino	39.1500	-123.1997	56.7	57	-9	-9
60450009	California	Mendocino	39.4031	-123.3492	45.3	46	-9	-9
60530002	California	Monterey	36.4958	-121.7306	61	63	-9	-9
60530005	California	Monterey	36.2275	-121.1156	58.3	60	-9	-9
60550003	California	Napa	38.3108	-122.2947	59.3	61	-9	-9
60590007	California	Orange	33.8306	-117.9385	77.3	81	-9	-9
60595001	California	Orange	33.9251	-117.9526	76	79	-9	-9
60750005	California	San Francisco	37.7660	-122.3991	46	48	-9	-9
60790005	California	San Luis Obispo	35.6317	-120.6900	70.7	71	-9	-9
60792001	California	San Luis Obispo	35.1250	-120.6333	57	57	-9	-9
60792002	California	San Luis Obispo	35.2839	-120.6542	57	57	-9	-9
60792006	California	San Luis Obispo	35.2566	-120.6689	55	55	-9	-9
60793001	California	San Luis Obispo	35.3657	-120.8429	54.3	56	-9	-9
60794002	California	San Luis Obispo	35.0315	-120.5009	60.7	64	-9	-9
60798001	California	San Luis Obispo	35.4914	-120.6681	67.3	68	-9	-9

Monitor ID	State	County	Monitor Latitude	Monitor Longitude	Average Design Value 2003-2007 (ppb)	Maximum Design Value 2003-2007 (ppb)	Average Design Value 2012	Maximum Design Value 2012
60811001	California	San Mateo	37.4829	-122.2034	53.7	57	-9	-9
60831008	California	Santa Barbara	34.9492	-120.4367	50.7	53	-9	-9
60831013	California	Santa Barbara	34.7256	-120.4278	66.3	70	-9	-9
60831018	California	Santa Barbara	34.5274	-120.1965	56.7	60	-9	-9
60832004	California	Santa Barbara	34.6378	-120.4575	54	56	-9	-9
60834003	California	Santa Barbara	34.5961	-120.6303	65.3	69	-9	-9
60850005	California	Santa Clara	37.3485	-121.8950	61.7	63	-9	-9
60852007	California	Santa Clara	37.3553	-122.0514	59	64	-9	-9
60870003	California	Santa Cruz	37.0119	-122.1933	51	52	-9	-9
60870004	California	Santa Cruz	36.9333	-121.7958	54.7	56	-9	-9
60893003	California	Shasta	40.5369	-121.5725	69.7	72	-9	-9
60932001	California	Siskiyou	41.7283	-122.6344	63.5	64	-9	-9
60950004	California	Solano	38.1027	-122.2382	57	60	-9	-9
60970003	California	Sonoma	38.4435	-122.7100	47.7	49	-9	-9
80677003	Colorado	La Plata	37.1022	-107.8694	63.7	66	-9	-9
80830101	Colorado	Montezuma	37.1983	-108.4903	72	73	-9	-9
160010030	Idaho	Ada	43.5895	-116.2235	76	77	-9	-9
160270007	Idaho	Canyon	43.7056	-116.6232	66	66	-9	-9
160390010	Idaho	Elmore	43.2866	-115.8532	63	63	-9	-9
160550003	Idaho	Kootenai	47.7889	-116.8045	67	67	-9	-9
300298001	Montana	Flathead	48.5103	-113.9956	56.3	57	-9	-9
301110086	Montana	Yellowstone	45.9426	-108.3510	59	59	-9	-9
320030023	Nevada	Clark	36.8081	-114.0608	70	71	-9	-9
320310016	Nevada	Washoe	39.5251	-119.8077	70	71	-9	-9
320310020	Nevada	Washoe	39.4696	-119.7753	70.7	71	-9	-9
320310025	Nevada	Washoe	39.4000	-119.7396	67.3	69	-9	-9
320311005	Nevada	Washoe	39.5405	-119.7469	70.7	71	-9	-9
320312002	Nevada	Washoe	39.2506	-119.9564	65	65	-9	-9
320312009	Nevada	Washoe	39.6455	-119.8399	67.7	71	-9	-9
320330101	Nevada	White Pine	39.0053	-114.2158	72.3	73	-9	-9
325100004	Nevada	Carson City	39.1731	-119.7592	65	66	-9	-9
350010029	New Mexico	Bernalillo	35.0171	-106.6574	69	69	-9	-9
350011012	New Mexico	Bernalillo	35.1852	-106.5082	69.3	77	-9	-9
350130008	New Mexico	Dona Ana	31.9306	-106.6306	70.7	72	-9	-9
350130017	New Mexico	Dona Ana	31.7958	-106.5575	71.3	72	-9	-9
350130020	New Mexico	Dona Ana	32.0411	-106.4092	70.7	72	-9	-9
350130021	New Mexico	Dona Ana	31.7961	-106.5839	75.3	77	-9	-9
350130022	New Mexico	Dona Ana	31.7878	-106.6828	72.7	74	-9	-9
350130023	New Mexico	Dona Ana	32.3175	-106.7678	66.5	67	-9	-9
350151005	New Mexico	Eddy	32.3800	-104.2622	69	69	-9	-9
350171003	New Mexico	Grant	32.6919	-108.1244	66	66	-9	-9
350250008	New Mexico	Lea	32.7267	-103.1229	69.5	71	-9	-9
350431001	New Mexico	Sandoval	35.2994	-106.5483	67.7	70	-9	-9

Monitor ID	State	County	Monitor Latitude	Monitor Longitude	Average Design Value 2003-2007 (ppb)	Maximum Design Value 2003-2007 (ppb)	Average Design Value 2012	Maximum Design Value 2012
350439004	New Mexico	Sandoval	35.6153	-106.7244	71	71	-9	-9
410050004	Oregon	Clackamas	45.2597	-122.5875	66.3	68	-9	-9
410052002	Oregon	Clackamas	45.4432	-122.6380	56.7	58	-9	-9
410090004	Oregon	Columbia	45.7681	-122.7719	58.7	60	-9	-9
410290201	Oregon	Jackson	42.2294	-122.7875	68	69	-9	-9
410390060	Oregon	Lane	44.0263	-123.0837	66.7	68	-9	-9
410391007	Oregon	Lane	43.8345	-123.0353	69.3	72	-9	-9
410470004	Oregon	Marion	44.8094	-122.9136	65.7	66	-9	-9
410510080	Oregon	Multnomah	45.4967	-122.6022	56.3	57	-9	-9
490037001	Utah	Box Elder	41.9460	-112.2332	76	76	-9	-9
490050004	Utah	Cache	41.7311	-111.8375	68.7	72	-9	-9
490370101	Utah	San Juan	38.4500	-109.8167	70.3	71	-9	-9
490530130	Utah	Washington	37.1983	-113.1506	78.5	79	-9	-9
530110011	Washington	Clark	45.6167	-122.5167	59.5	60	-9	-9
530330010	Washington	King	47.5525	-122.0647	60.3	61	-9	-9
530330017	Washington	King	47.4897	-121.7733	66.3	71	-9	-9
530330023	Washington	King	47.1411	-121.9331	72.3	74	-9	-9
530390003	Washington	Klickitat	45.6662	-121.0007	64.5	65	-9	-9
530530012	Washington	Pierce	46.7853	-121.7328	63	67	-9	-9
530531008	Washington	Pierce	46.8431	-122.3175	68.7	70	-9	-9
530570018	Washington	Skagit	48.4601	-122.5191	46	47	-9	-9
530630001	Washington	Spokane	47.4165	-117.5300	61	62	-9	-9
530630046	Washington	Spokane	47.8272	-117.2753	68.3	71	-9	-9
530670002	Washington	Thurston	46.9364	-122.6108	65	65	-9	-9
530730005	Washington	Whatcom	48.9526	-122.5545	57	57	-9	-9
560050123	Wyoming	Campbell	44.6721	-105.2903	67.3	69	-9	-9
560050456	Wyoming	Campbell	44.1470	-105.5300	65.3	67	-9	-9
560350098	Wyoming	Sublette	42.4294	-109.6957	70	70	-9	-9
560350100	Wyoming	Sublette	42.7926	-110.0558	68	68	-9	-9
560391011	Wyoming	Teton	44.5653	-110.4000	62.7	64	-9	-9



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

JAN 12 2016

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

SUBJECT: Clean Air Act Section 185 Fee Rates for Calendar Years 1990 – 2015

FROM: Scott Mathias, Associate Director
Air Quality Policy Division *Scott Mathias*

TO: Air Program Managers, Regions 1-10

This memorandum provides Clean Air Act (CAA) section 185 penalty fee rates (\$/ton of ozone precursor emissions) for each year from 1990 to 2015. The Environmental Protection Agency has calculated the 40 CFR part 70 presumptive minimum permit fee rate since 1990, and updates the rate every year in September, when the August values are available.¹ The adjusted section 185 fee rate for each period is prorated to the adjusted permit fee for the same period, as shown in Table 1 (attached), by multiplying the 40 CFR part 70 permit fee rate by 200 (\$5,000/\$25).

Since section 185 fees are assessed on a calendar year basis, and the inflation factor is applied in September, the calendar year fee is determined as a weighted average (8/12 of the fee associated with January to August, and 4/12 of the fee associated with September to December). The weighted fees through the end of calendar year 2015 appear in Table 2 (attached). The section 185 fee rate for the fee assessment any given calendar year is the annualized fee rate at the end of the fee assessment period.

For questions regarding this memorandum or the attachments, please contact Lynn Dail, of my office, at (919) 541-2363 or dail.lynn@epa.gov.

Attachments (2)

¹ CAA Section 185 cross-references the methodology in section 502(b)(3)(B)(v) for determining fee rates. This method has been interpreted for use in determining permit fee rates for each period based on a calculation of the average monthly change in the Consumer Price Index (All Urban Consumers) for the prior 12-month period running from September to August, as reported by the U.S. Bureau of Labor Statistics.

TABLE 1: SECTION 185 FEE RATE BASED ON PART 70 PERMIT FEE RATE

Effective Dates	Part 70 Permit Fee Rate*	Adjusted Sect. 185 Fee Rate
Sept 1989–Aug 1990	\$25.00	\$5,000.00
Sept 1990–Aug 1991	\$26.21	\$5,242.00
Sept 1991–Aug 1992	\$27.59	\$5,518.00
Sept 1992–Aug 1993	\$28.43	\$5,686.00
Sept 1993–Aug 1994	\$29.30	\$5,860.00
Sept 1994–Aug 1995	\$30.07	\$6,014.00
Sept 1995–Aug 1996	\$30.93	\$6,186.00
Sept 1996–Aug 1997	\$31.78	\$6,356.00
Sept 1997–Aug 1998	\$32.65	\$6,530.00
Sept 1998–Aug 1999	\$33.21	\$6,642.00
Sept 1999–Aug 2000	\$33.82	\$6,764.00
Sept 2000–Aug 2001	\$34.87	\$6,974.00
Sept 2001–Aug 2002	\$36.03	\$7,206.00
Sept 2002–Aug 2003	\$36.60	\$7,320.00
Sept 2003–Aug 2004	\$37.43	\$7,486.00
Sept 2004–Aug 2005	\$38.29	\$7,658.00
Sept 2005–Aug 2006	\$39.48	\$7,896.00
Sept 2006–Aug 2007	\$41.02	\$8,204.00
Sept 2007–Aug 2008	\$41.96	\$8,392.00
Sept 2008–Aug 2009	\$43.75	\$8,750.00
Sept 2009–Aug 2010	\$43.83	\$8,766.00
Sept 2010–Aug 2011	\$44.48	\$8,896.00
Sept 2011–Aug 2012	\$45.55	\$9,110.00
Sept 2012–Aug 2013	\$46.73	\$9,346.00
Sept 2013–Aug 2014	\$47.52	\$9,504.00
Sept 2014–Aug 2015	\$48.27	\$9,654.00
Sept 2015–Aug 2016	\$48.49	\$9,698.00

* From <http://www.epa.gov/title-v-operating-permits/historical-permit-fee-rates>.

TABLE 2: ANNUALIZED SECTION 185 FEE RATE

Sect. 185 Year	Annualized Sect. 185 Fee Rate
1990	\$5,080.67
1991	\$5,334.00
1992	\$5,574.00
1993	\$5,744.00
1994	\$5,911.33
1995	\$6,071.33
1996	\$6,242.67
1997	\$6,414.00
1998	\$6,567.33
1999	\$6,682.67
2000	\$6,834.00
2001	\$7,051.33
2002	\$7,244.00
2003	\$7,375.33
2004	\$7,543.33
2005	\$7,737.33
2006	\$7,998.67
2007	\$8,266.67
2008	\$8,511.33
2009	\$8,755.33
2010	\$8,809.33
2011	\$8,967.33
2012	\$9,188.67
2013	\$9,398.67
2014	\$9,554.00
2015	\$9,668.67

To: Cyran, Carissa[Cyran.Carissa@epa.gov]; McCabe, Janet[McCabe.Janet@epa.gov]; Stewart, Lori[Stewart.Lori@epa.gov]
From: McCabe, Janet
Sent: Mon 4/11/2016 1:35:11 AM
Subject: PM Imp jm 4-10-16.docx 111-146
PM Imp jm 4-10-16.docx

Comments on pp 111-146

To: Cyran, Carissa[Cyran.Carissa@epa.gov]; McCabe, Janet[McCabe.Janet@epa.gov]
Cc: Stewart, Lori[Stewart.Lori@epa.gov]
From: McCabe, Janet
Sent: Sun 4/10/2016 5:58:35 PM
Subject: PM Imp jm 4-10-16.docx pp. 68-111
PM Imp jm 4-10-16.docx

pp. 68-111.

To: McCabe, Janet[McCabe.Janet@epa.gov]
Cc: Cyran, Carissa[Cyran.Carissa@epa.gov]; Stewart, Lori[Stewart.Lori@epa.gov]; Smith, Kristi[Smith.Kristi@epa.gov]; Orlin, David[Orlin.David@epa.gov]; Doster, Brian[Doster.Brian@epa.gov]; Terry, Sara[Terry.Sara@epa.gov]; Ashley, Jackie[Ashley.Jackie@epa.gov]; Noonan, Jenny[Noonan.Jenny@epa.gov]; Saltman, Tamara[Saltman.Tamara@epa.gov]; Lubetsky, Jonathan[Lubetsky.Jonathan@epa.gov]
From: Niebling, William
Sent: Fri 4/8/2016 9:01:14 PM
Subject: Ozone testimony
[BILLS-114hr4775ih.pdf](#)
[HEC Olson Ozone Bill Hearing Testimony DRAFT for JM bis.docx](#)

Janet –

You asked me to pass back edits to the Olson ozone bill testimony. Attached is a redline that reflects edits from the last version you saw (some of them are yours). OGC weighed in with some thoughts and so in a couple of instances I decided to rewrite or delete troublesome bits. That is explained in the comments. On your point at the end about economic benefits of air pollution control technology – OAQPS has said they will let me know Monday morning if they have something we can include or not. I'll make a call, and then we'll ship it up to OMB. In the meantime, please let us know if you have further edits. Since you are traveling and so this is now an electronic exercise, I'm copying widely so that my seeing and your comments doesn't slow us down unnecessarily.

Thanks!

-Wm.

William L. Niebling

Office of Air and Radiation

U.S. Environmental Protection Agency

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114TH CONGRESS
2^D SESSION

H. R. 4775

To facilitate efficient State implementation of ground-level ozone standards,
and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

MARCH 17, 2016

Mr. OLSON (for himself, Mr. FLORES, Mr. SCALISE, Mr. LATTA, Mr. MCCARTHY, and Mr. CUELLAR) introduced the following bill; which was referred to the Committee on Energy and Commerce

A BILL

To facilitate efficient State implementation of ground-level
ozone standards, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Ozone Standards Im-
5 plementation Act of 2016”.

6 **SEC. 2. FACILITATING STATE IMPLEMENTATION OF EXIST-**
7 **ING OZONE STANDARDS.**

8 (a) DESIGNATIONS.—

9 (1) DESIGNATION SUBMISSION.—Not later than
10 October 26, 2024, notwithstanding the deadline

1 specified in paragraph (1)(A) of section 107(d) of
2 the Clean Air Act (42 U.S.C. 7407(d)), the Gov-
3 ernor of each State shall designate in accordance
4 with such section 107(d) all areas (or portions there-
5 of) of the Governor's State as attainment, nonattain-
6 ment, or unclassifiable with respect to the 2015
7 ozone standards.

8 (2) DESIGNATION PROMULGATION.—Not later
9 than October 26, 2025, notwithstanding the deadline
10 specified in paragraph (1)(B) of section 107(d) of
11 the Clean Air Act (42 U.S.C. 7407(d)), the Adminis-
12 trator shall promulgate final designations under
13 such section 107(d) for all areas in all States with
14 respect to the 2015 ozone standards, including any
15 modifications to the designations submitted under
16 paragraph (1).

17 (3) STATE IMPLEMENTATION PLANS.—Not
18 later than October 26, 2026, notwithstanding the
19 deadline specified in section 110(a)(1) of the Clean
20 Air Act (42 U.S.C. 7410(a)(1)), each State shall
21 submit the plan required by such section 110(a)(1)
22 for the 2015 ozone standards.

23 (b) CERTAIN PRECONSTRUCTION PERMITS.—

1 (1) IN GENERAL.—The 2015 ozone standards
2 shall not apply to the review and disposition of a
3 preconstruction permit application if—

4 (A) the Administrator or the State, local,
5 or tribal permitting authority, as applicable, de-
6 termines the application to be complete on or
7 before the date of promulgation of the final des-
8 ignation of the area involved under subsection
9 (a)(2); or

10 (B) the Administrator or the State, local,
11 or tribal permitting authority, as applicable,
12 publishes a public notice of a preliminary deter-
13 mination or draft permit for the application be-
14 fore the date that is 60 days after the date of
15 promulgation of the final designation of the
16 area involved under subsection (a)(2).

17 (2) RULES OF CONSTRUCTION.—Nothing in
18 this section shall be construed to—

19 (A) eliminate the obligation of a
20 preconstruction permit applicant to install best
21 available control technology and lowest achiev-
22 able emission rate technology, as applicable; or

23 (B) limit the authority of a State, local, or
24 tribal permitting authority to impose more
25 stringent emissions requirements pursuant to

1 State, local, or tribal law than national ambient
2 air quality standards.

3 **SEC. 3. FACILITATING STATE IMPLEMENTATION OF NA-**
4 **TIONAL AMBIENT AIR QUALITY STANDARDS.**

5 (a) **TIMELINE FOR REVIEW OF NATIONAL AMBIENT**
6 **AIR QUALITY STANDARDS.—**

7 (1) **10-YEAR CYCLE FOR ALL CRITERIA AIR**
8 **POLLUTANTS.—**Paragraphs (1) and (2)(B) of sec-
9 tion 109(d) of the Clean Air Act (42 U.S.C.
10 7409(d)) are amended by striking “five-year inter-
11 vals” each place it appears and inserting “10-year
12 intervals”.

13 (2) **CYCLE FOR NEXT REVIEW OF OZONE CRI-**
14 **TERIA AND STANDARDS.—**Notwithstanding section
15 109(d) of the Clean Air Act (42 U.S.C. 7409(d)),
16 the Administrator shall not—

17 (A) complete, before October 26, 2025, any
18 review of the criteria for ozone published under
19 section 108 of such Act (42 U.S.C. 7408) or
20 the national ambient air quality standard for
21 ozone promulgated under section 109 of such
22 Act (42 U.S.C. 7409); or

23 (B) propose, before such date, any revi-
24 sions to such criteria or standard.

1 (b) CONSIDERATION OF TECHNOLOGICAL FEASI-
2 BILITY.—Section 109(b)(1) of the Clean Air Act (42
3 U.S.C. 7409(b)(1)) is amended by inserting after the first
4 sentence the following: “If the Administrator, in consulta-
5 tion with the independent scientific review committee ap-
6 pointed under subsection (d), finds that a range of levels
7 of air quality for an air pollutant are requisite to protect
8 public health with an adequate margin of safety, as de-
9 scribed in the preceding sentence, the Administrator may
10 consider, as a secondary consideration, likely technological
11 feasibility in establishing and revising the national pri-
12 mary ambient air quality standard for such pollutant.”.

13 (c) CONSIDERATION OF ADVERSE PUBLIC HEALTH,
14 WELFARE, SOCIAL, ECONOMIC, OR ENERGY EFFECTS.—
15 Section 109(d)(2) of the Clean Air Act (42 U.S.C.
16 7409(d)(2)) is amended by adding at the end the fol-
17 lowing:

18 “(D) Prior to establishing or revising a national am-
19 bient air quality standard, the Administrator shall re-
20 quest, and such committee shall provide, advice under sub-
21 paragraph (C)(iv) regarding any adverse public health,
22 welfare, social, economic, or energy effects which may re-
23 sult from various strategies for attainment and mainte-
24 nance of such national ambient air quality standard.”.

1 (d) TIMELY ISSUANCE OF IMPLEMENTING REGULA-
2 TIONS AND GUIDANCE.—Section 109 of the Clean Air Act
3 (42 U.S.C. 7409) is amended by adding at the end the
4 following:

5 “(e) TIMELY ISSUANCE OF IMPLEMENTING REGULA-
6 TIONS AND GUIDANCE.—

7 “(1) IN GENERAL.—In publishing any final rule
8 establishing or revising a national ambient air qual-
9 ity standard, the Administrator shall, as the Admin-
10 istrator determines necessary to assist States, per-
11 mitting authorities, and permit applicants, concu-
12 rently publish regulations and guidance for imple-
13 menting the standard, including information relating
14 to submission and consideration of a preconstruction
15 permit application under the new or revised stand-
16 ard.

17 “(2) APPLICABILITY OF STANDARD TO
18 PRECONSTRUCTION PERMITTING.—If the Adminis-
19 trator fails to publish final regulations and guidance
20 that include information relating to submission and
21 consideration of a preconstruction permit application
22 under a new or revised national ambient air quality
23 standard concurrently with such standard, then such
24 standard shall not apply to the review and disposi-
25 tion of a preconstruction permit application until the

1 Administrator has published such final regulations
2 and guidance.

3 “(3) RULES OF CONSTRUCTION.—

4 “(A) Nothing in this subsection shall be
5 construed to preclude the Administrator from
6 issuing regulations and guidance to assist
7 States, permitting authorities, and permit appli-
8 cants in implementing a national ambient air
9 quality standard subsequent to publishing regu-
10 lations and guidance for such standard under
11 paragraph (1).

12 “(B) Nothing in this subsection shall be
13 construed to eliminate the obligation of a
14 preconstruction permit applicant to install best
15 available control technology and lowest achiev-
16 able emission rate technology, as applicable.

17 “(C) Nothing in this subsection shall be
18 construed to limit the authority of a State,
19 local, or tribal permitting authority to impose
20 more stringent emissions requirements pursu-
21 ant to State, local, or tribal law than national
22 ambient air quality standards.

23 “(4) DEFINITIONS.—In this subsection:

1 “(A) The term ‘best available control tech-
2 nology’ has the meaning given to that term in
3 section 169(3).

4 “(B) The term ‘lowest achievable emission
5 rate’ has the meaning given to that term in sec-
6 tion 171(3).

7 “(C) The term ‘preconstruction permit’—

8 “(i) means a permit that is required
9 under part C or D for the construction or
10 modification of a major emitting facility or
11 major stationary source; and

12 “(ii) includes any such permit issued
13 by the Environmental Protection Agency
14 or a State, local, or tribal permitting au-
15 thority.”.

16 (e) CONTINGENCY MEASURES FOR EXTREME OZONE
17 NONATTAINMENT AREAS.—Section 172(c)(9) of the Clean
18 Air Act (42 U.S.C. 7502(c)(9)) is amended by adding at
19 the end the following: “Notwithstanding the preceding
20 sentences and any other provision of this Act, such meas-
21 ures shall not be required for any nonattainment area for
22 ozone classified as an Extreme Area.”.

23 (f) PLAN SUBMISSIONS AND REQUIREMENTS FOR
24 OZONE NONATTAINMENT AREAS.—Section 182 of the
25 Clean Air Act (42 U.S.C. 7511a) is amended—

1 (1) in subsection (b)(1)(A)(ii)(III), by inserting
 2 “and economic feasibility” after “technological
 3 achievability”;

4 (2) in subsection (c)(2)(B)(ii), by inserting
 5 “and economic feasibility” after “technological
 6 achievability”; and

7 (3) in paragraph (5) of subsection (e), by strik-
 8 ing “, if the State demonstrates to the satisfaction
 9 of the Administrator that—” and all that follows
 10 through the end of the paragraph and inserting a
 11 period.

12 (g) PLAN REVISIONS FOR MILESTONES FOR PARTIC-
 13 ULATE MATTER NONATTAINMENT AREAS.—Section
 14 189(c)(1) of the Clean Air Act (42 U.S.C. 7513a(c)(1))
 15 is amended by inserting “, which take into account techno-
 16 logical achievability and economic feasibility,” before “and
 17 which demonstrate reasonable further progress”.

18 (h) EXCEPTIONAL EVENTS.—Section 319(b)(1)(B)
 19 of the Clean Air Act (42 U.S.C. 7619(b)(1)(B)) is amend-
 20 ed—

21 (1) in clause (i)—

22 (A) by striking “(i) stagnation of air
 23 masses or” and inserting “(i)(I) ordinarily oc-
 24 ccurring stagnation of air masses or (II)”; and

25 (B) by inserting “or” after the semicolon;

1 (2) by striking clause (ii); and

2 (3) by redesignating clause (iii) as clause (ii).

3 (i) REPORT ON EMISSIONS EMANATING FROM OUT-
4 SIDE THE UNITED STATES.—Not later than 24 months
5 after the date of enactment of this Act, the Administrator,
6 in consultation with States, shall submit to the Congress
7 a report on—

8 (1) the extent to which foreign sources of air
9 pollution, including emissions from sources located
10 outside North America, impact—

11 (A) designations of areas (or portions
12 thereof) as nonattainment, attainment, or
13 unclassifiable under section 107(d) of the Clean
14 Air Act (42 U.S.C. 7407(d)); and

15 (B) attainment and maintenance of na-
16 tional ambient air quality standards;

17 (2) the Environmental Protection Agency's pro-
18 cedures and timelines for disposing of petitions sub-
19 mitted pursuant to section 179B(b) of the Clean Air
20 Act (42 U.S.C. 7509a(b));

21 (3) the total number of petitions received by the
22 Agency pursuant to such section 179B(b), and for
23 each such petition the date initially submitted and
24 the date of final disposition by the Agency; and

1 (4) whether the Administrator recommends any
2 statutory changes to facilitate the more efficient re-
3 view and disposition of petitions submitted pursuant
4 to such section 179B(b).

5 **SEC. 4. DEFINITIONS.**

6 In this Act:

7 (1) ADMINISTRATOR.—The term “Adminis-
8 trator” means the Administrator of the Environ-
9 mental Protection Agency.

10 (2) BEST AVAILABLE CONTROL TECH-
11 NOLOGY.—The term “best available control tech-
12 nology” has the meaning given to that term in sec-
13 tion 169(3) of the Clean Air Act (42 U.S.C.
14 7479(3)).

15 (3) LOWEST ACHIEVABLE EMISSION RATE.—
16 The term “lowest achievable emission rate” has the
17 meaning given to that term in section 171(3) of the
18 Clean Air Act (42 U.S.C. 7501(3)).

19 (4) NATIONAL AMBIENT AIR QUALITY STAND-
20 ARD.—The term “national ambient air quality
21 standard” means a national ambient air quality
22 standard promulgated under section 109 of the
23 Clean Air Act (42 U.S.C. 7409).

24 (5) PRECONSTRUCTION PERMIT.—The term
25 “preconstruction permit”—

1 (A) means a permit that is required under
2 part C or D of title I of the Clean Air Act (42
3 U.S.C. 7470 et seq.) for the construction or
4 modification of a major emitting facility or
5 major stationary source; and

6 (B) includes any such permit issued by the
7 Environmental Protection Agency or a State,
8 local, or tribal permitting authority.

9 (6) 2015 OZONE STANDARDS.—The term “2015
10 ozone standards” means the national ambient air
11 quality standards for ozone published in the Federal
12 Register on October 26, 2015 (80 Fed. Reg. 65292).

Æ

To: McCabe, Janet[McCabe.Janet@epa.gov]
Cc: Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Argyropoulos, Paul[Argyropoulos.Paul@epa.gov]; Charmley, William[charmley.william@epa.gov]; Orlin, David[Orlin.David@epa.gov]; Dubois, Roland[Dubois.Roland@epa.gov]
From: Grundler, Christopher
Sent: Fri 4/8/2016 1:43:11 AM
Subject: Fwd: Request for Correction of Information on ethanol's lifecycle emissions
[RFC on Ethanol's Lifecycle Emissions.pdf](#)
[ATT00001.htm](#)

This just in

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. Environmental Protection Agency
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734.214.4207 (Ann Arbor)
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Begin forwarded message:

From: Adam Gustafson <gustafson@boydengrayassociates.com>
Date: April 7, 2016 at 9:29:23 PM EDT
To: "quality@epa.gov" <quality@epa.gov>
Cc: "grundler.christopher@epa.gov" <grundler.christopher@epa.gov>, "machiele.paul@epa.gov" <machiele.paul@epa.gov>, "costa.dan@epa.gov" <costa.dan@epa.gov>, "olden.kenneth@epa.gov" <olden.kenneth@epa.gov>, "James Conde" <conde@boydengrayassociates.com>
Subject: Request for Correction of Information on ethanol's lifecycle emissions

Dear Sir or Madam (cc: Chris Grundler, Paul Machiele, Dan Costa, Kenneth Olden),

On behalf of the Energy Future Coalition, Urban Air Initiative, and Governors' Biofuels Coalition, attached please find a Request for Correction of Information pursuant to EPA's Information Quality Guidelines.

As described in the RFC, the information in question concerns ethanol's lifecycle emissions of greenhouse gas and other pollutants. The erroneous information first appeared in the Regulatory Impact Analysis for EPA's 2010 RFS Rule and EPA's 2011 Report to Congress on Biofuels and the Environment, and it continues to be disseminated in recent regulatory actions and on EPA's website.

Please do not hesitate to contact me if you have any questions about this RFC.

Sincerely,

Adam Gustafson

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REQUEST FOR CORRECTION OF INFORMATION

submitted on behalf of

**THE ENERGY FUTURE COALITION, URBAN AIR INITIATIVE, and
GOVERNORS' BIOFUELS COALITION**

Concerning the U.S. Environmental Protection Agency's

**LIFECYCLE ANALYSIS OF ETHANOL AND GASOLINE
UNDER THE RENEWABLE FUEL STANDARD**

by C. Boyden Gray
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April 7, 2016

EXECUTIVE SUMMARY

The Energy Future Coalition, Urban Air Initiative, and Governors' Biofuels Coalition (Petitioners) respectfully petition the United States Environmental Protection Agency (EPA) to correct information concerning ethanol's lifecycle emissions of greenhouse gas (GHG) and other pollutants. This information was first published in the Regulatory Impact Analysis (2010 Lifecycle Analysis) accompanying EPA's 2010 Renewable Fuel Standard (RFS) Rule and in EPA's 2011 First Triennial Report to Congress on the environmental impacts of the RFS. EPA continues to use this information in recent RFS rules and other regulatory actions and to publish it on the Agency's website.

EPA's information on ethanol's lifecycle emissions is inaccurate and outdated. Contrary to the Agency's 2010 Lifecycle Analysis and its 2011 Report to Congress, the best available science shows that blending ethanol into gasoline has significantly reduced emissions of GHGs and other air pollutants and that displacing gasoline with higher concentrations of ethanol would reduce emissions even further. EPA's continued reliance on erroneous lifecycle estimates will result in damaging legislative and regulatory biofuel policies. And continued dissemination of this misleading information distorts the public's perception of the nation's only viable low-carbon transportation fuel.

EPA should correct its 2010 Lifecycle Analysis for future RFS rules, submit a corrected triennial report to Congress (now two years overdue), and cease to rely upon and disseminate its current, erroneous information. EPA's ethanol lifecycle emissions estimates were inaccurate when they were published six years ago, and they have only become more inaccurate in the intervening years as ethanol production has become cleaner and gasoline has become dirtier.

GREENHOUSE GAS EMISSIONS

New evidence shows that GHG emissions from ethanol are lower than EPA predicted in its 2010 Lifecycle Analysis, and much lower than the lifecycle emissions of gasoline. In particular, new evidence shows that:

- Increased demand for corn causes much less land-use change and related emissions than EPA predicted in 2010. This evidence includes improved economic models and newly available land-use data from periods of increasing corn ethanol production, which show significant increases in yield but no significant increases in forest conversion.
- Improved agricultural practices and technologies are substantially reducing the carbon intensity of ethanol by increasing the ability of soil to capture and retain carbon deep below ground. This evidence includes updated science on soil organic carbon, which indicates that best tillage practices sequester more carbon in the soil than previously thought. In fact, the evidence suggests that many corn fields are net carbon “sinks,” capturing more carbon than land-use change and corn farming releases.
- More efficient agricultural practices and technologies have also reduced the per bushel amount of nitrogen fertilizer applied to the corn crop and converted into the greenhouse gas nitrous oxide (N₂O).
- Biorefineries have become much more efficient, using less natural gas and electricity to produce each gallon of ethanol. Biorefineries are also producing new co-products that reduce the carbon intensity of ethanol. These include distillers’ grains, which is used as animal feed; corn oil, which replaces soy-based biodiesel; and other co-products that lower the carbon intensity of corn ethanol.
- By contrast, petroleum-based fuels are becoming increasingly carbon-intensive. As a result, the gasoline carbon intensity baseline should be significantly higher than EPA suggested, increasing the comparative benefit of ethanol.

Considered in light of this new evidence, the lifecycle GHG benefits of the RFS are much greater than EPA predicted. Indeed, blending the volumes of renewable fuel called for by the RFS through 2022 would result in substantial cumulative reductions in carbon emissions—the RFS has already prevented more than 354 million metric tons of GHG pollution, according to a recent conservative estimate, and it will result in even higher savings in the future.

EPA should also consider the following information when updating its lifecycle analysis:

- Any initial CO₂ emissions associated with the initial implementation of the RFS are now “sunk costs,” since corn ethanol has already reached the levels projected by the RFS. Thus, continued ethanol use is substantially less carbon-intensive than EPA suggested in 2010 and offers net GHG savings compared to the gasoline it displaces.

- Other tailpipe emissions associated with conventional gasoline aromatic hydrocarbons (which ethanol can replace), produce non-GHG “climate forcing agents” such as black carbon that contribute to climate change, whereas ethanol *reduces* those emissions.
- Ethanol’s pollution-reducing benefits could be even greater if it were used to produce higher-octane fuel blends, replacing toxic and carbon-intensive fuel additives while allowing carmakers to increase vehicle fuel economy through next-generation engine design.

In light of this new evidence, EPA should correct its 2010 Lifecycle Analysis to conform to the best available science.

CONVENTIONAL AIR POLLUTANTS

Like EPA’s GHG analysis, the Agency’s 2010 Lifecycle Analysis and the 2011 Report to Congress also contain erroneous estimates of ethanol’s effect on emissions of non-GHG (or “conventional”) pollutants. In particular, new evidence shows that:

- The farming technologies that have increased yields and lowered carbon intensity have also reduced emissions of conventional air pollutants.
- Improved control technologies and other innovations have lowered emissions from biorefineries.
- U.S. gasoline is increasingly produced from “tight oil,” which does more damage to the nation’s air quality because it is produced domestically and because it produces higher air toxic emissions during extraction and refining.
- The negative health effects of aromatics—the octane additives in gasoline that are displaced by ethanol—are worse than previously estimated, increasing urban particulate matter and other air toxics.

The latest fuel effects studies also show that EPA erred in its estimate of tailpipe emissions from E10. In particular, new evidence shows that:

- E10 reduces benzene, toluene, ethylbenzene, and xylene emissions.
- E10 reduces particulate matter, especially in modern gasoline direct injection engines.
- E10 also reduces dangerous polycyclic aromatic hydrocarbons, as well as secondary organic aerosols.
- E10 has little or no effect on nitrogen oxides; in modern engines with oxygen sensors, E10 reduces nitrogen oxide emissions.

- E10 does not increase volatile organic compound emissions. In fact, ethanol reduces these emissions when it is blended into gasoline in higher volumes.

In addition to the emissions reductions ethanol has already achieved, transitioning to gasoline blends with a higher ethanol content, such as E30, would significantly reduce lifecycle emissions and improve air quality.

* * *

A review of the scientific literature confirms that EPA fundamentally erred in the conclusions it reached about the lifecycle emissions of GHGs and other pollutants from ethanol. Despite significant improvements in the relevant technology and a growing body of updated scientific studies, EPA continues to regulate on the basis of its 2010 Lifecycle Analysis, relying on it as recently as last month in a new fuel pathway determination and last year in the 2014–2016 RFS Standards. And EPA continues to publish its outdated 2011 Report to Congress online, having failed to correct its inaccurate information in a follow-up triennial report, as the law requires. Petitioners therefore urge EPA to correct its analysis of the comparative lifecycle pollution effects of ethanol and gasoline in light of the best available science. Continued dissemination of and reliance on erroneous estimates undermines the scientific basis for important policy decisions in the critical area of fuel regulation.

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INTRODUCTION

In 2010, EPA conducted a comprehensive lifecycle analysis of corn ethanol and gasoline in support of its RFS program.¹ EPA's 2010 Lifecycle Analysis included GHG and air pollutant emission inventories, future industry projections, and the scientific evidence then available.² As EPA noted, the scientific evidence that the Agency relied upon to model lifecycle emissions was subject to many uncertainties, and would change as the science improved.³ EPA recognized that its lifecycle analysis would need to be updated as newly available science, improved emissions estimates, and new data became available.⁴ EPA therefore committed to "further reassess . . . the lifecycle estimates" on an ongoing basis.⁵

¹ See Renewable Fuel Standard Program, Regulatory Impact Analysis (2010) [hereinafter 2010 RFS RIA]. The Energy Independence and Security Act requires EPA to estimate lifecycle emissions, including emissions from land-use change. See 42 U.S.C. § 7545(o)(1)(H).

² Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program, 75 Fed. Reg. 14,670, 14,785 (Mar. 26, 2010) [hereinafter 2010 RFS Rule] (representing that the 2010 Lifecycle Analysis included the "most up to date information currently available on the GHG emissions associated with each element of the full lifecycle assessment.").

³ *Id.* at 14,765 ("EPA recognizes that as the state of scientific knowledge continues to evolve in this area, the lifecycle GHG assessments for a variety of fuel pathways will continue to change."); *Id.* at 14,786 ("EPA recognizes that the state of scientific knowledge in this area is continuing to evolve, and that as the science evolves, the lifecycle greenhouse gas assessments for a variety of fuel pathways will continue to change."). To illustrate the magnitude of EPA's scientific uncertainty, while EPA estimated a GHG reduction of 21% for corn ethanol, EPA's "95% confidence interval" ranged from a 7% to a 32% reduction. *Id.* at 14,786. This variance was primarily the result of EPA's uncertainty over GHG emissions from land-use change. *Id.* 14,765 ("The indirect, international emissions are the component of our analysis with the highest level of uncertainty.").

⁴ *Id.* at 14,765 ("EPA recognizes that as the state of scientific knowledge continues to evolve in this area, the lifecycle GHG assessments for a variety of fuel pathways will continue to change.").

⁵ *Id.* at 14,765 ("Therefore, while EPA is using its current lifecycle assessments to inform the regulatory determinations for fuel pathways in this final rule, as required by the statute, the Agency is also committing to further reassess these determinations and lifecycle estimates."); *Id.* at 14,785 ("Therefore, while EPA is making regulatory determinations for fuel pathways as required by the

In 2011, as required by statute,⁶ EPA published its First Triennial Report to Congress on the environmental impacts of the RFS, as mandated by the Energy Independence and Security Act of 2007 (EISA).⁷ The 2011 Report to Congress repeated and elaborated on the 2010 Lifecycle Analysis.⁸ Again EPA anticipated “the evolving understanding of biofuel impacts in light of new research results and data” and promised to revise its analysis, since “[t]his initial report to Congress serves as a starting point for future assessments.”⁹

As EPA predicted in 2010, new science now shows that its projections no longer represent “the best available information.”¹⁰ In fact, the scientific evidence shows that EPA’s 2010 Lifecycle Analysis and its 2011 Report to Congress were inaccurate at the time, and their assumptions have been supplanted by significant advances in agricultural production and biorefining, improved modeling, and new data. At every stage, corn ethanol results in less GHG emissions and air toxic pollution than EPA predicted in its 2010 Lifecycle Analysis and 2011 Report to Congress, and significantly less than gasoline. Thus, the best available science demonstrates that blending ethanol into gasoline is lowering GHG emissions

statute in this final rule based on its current assessment, EPA is at the same time committing to further reassess these determinations and the lifecycle estimates.”).

⁶ Energy Independence and Security Act, Pub. L. 110-140 § 204, 121 Stat. 1492, 1529 (2007) (codified at 42 U.S.C. § 7545 note).

⁷ U.S. EPA, Biofuels and the Environment: First Triennial Report to Congress, National Center for Environmental Assessment, EPA/600/R-10/183F (2011) [hereinafter 2011 Report to Congress].

⁸ See, e.g., *id.* at 2-3, 3-56, 4-6, 4-11, 4-15, 6-10; see also *id.* at 1-2 (“[I]t provides complementary information to the GHG impacts described in the [2010 RFS] RIA, which should be consulted for more information on this topic.” (citation omitted)); *id.* at 2-9.

⁹ *Id.*

¹⁰ 2010 RFS Rule, 75 Fed. Reg. at 14,785.

associated with climate change and improving human health. And ethanol's benefits would be even greater if it were blended at higher levels.

But despite this growing body of evidence, and despite EPA's assurances that it would reassess its initial estimates as the science evolved, six years later EPA continues to rely on its 2010 Lifecycle Analysis to justify new renewable fuel regulations under the RFS.¹¹ Just this month EPA again relied extensively on its 2010 Lifecycle Analysis to make the latest in a series of threshold "fuel pathway" determinations under the RFS.¹² And the Agency continues to disseminate the 2011 Report to Congress on its website, having failed to correct this information in a new triennial report to Congress, as the law requires.¹³

¹¹ See, e.g., Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass Based Diesel Volume for 2017, 80 Fed. Reg. 77420, 7748 (Dec. 14, 2015) [hereinafter RFS Standards for 2014–2016] ("EPA did not quantitatively assess other direct and indirect costs or benefits of increased biofuel volumes such as infrastructure costs, investment, GHG reduction benefits, air quality impacts, or energy security benefits, which all are to some degree affected by the rule. While some of these impacts were analyzed in the 2010 final rulemaking which established the current RFS program, we have not fully analyzed these impacts for the 2014, 2015, and 2016 volume requirements being established today. We have framed the analyses we have performed for this final rule as 'illustrative' so as not to give the impression of comprehensive estimates."); Regulation of Fuels and Fuel Additives: 2013 Renewable Fuel Standards, 78 Fed. Reg. 49,794, 49,814 (Aug. 15, 2013); Regulation of Fuels and Fuel Additives: Additional Qualifying Renewable Fuel Pathways Under the Renewable Fuel Standard Program; Final Rule Approving Renewable Fuel Pathways for Giant Reed (*Arundo Donax*) and Napier Grass (*Pennisetum Purpureum*), 78 Fed. Reg. 41,703, 41,705 (July 11, 2013).

¹² See, e.g., Letter from Christopher Grundler, Director, Office of Transportation and Air Quality, U.S. EPA, to Adam Crotteau, Vice President of Engineering, Green Plains Bluffton, LLC (Mar. 16, 2016) (making a threshold GHG pathway determination based on "a straightforward application of the same methodology and much of the same modeling used for the . . . 2010 RFS rule"), available at <http://1.usa.gov/22ZPOHj>. These determinations and accompanying memoranda, which cite the 2010 Lifecycle Analysis extensively, are published on EPA's website. EPA, Approved Pathways for Renewable Fuel, <https://www.epa.gov/renewable-fuel-standard-program/approved-pathways-renewable-fuel>.

¹³ See Energy Independence and Security Act, Pub. L. 110-140 § 204, 121 Stat. 1492, 1529 (2007) (codified at 42 U.S.C. § 7545 note). Congress did not legally require EPA to review GHG lifecycle emissions analyses, but EPA nevertheless restated its 2010 GHG analysis in its 2011 Report to Congress. See 2011 Report to Congress, *supra* note 7, at 2-9. On October 15, 2015, EPA's Office of Inspector General launched an evaluation project to determine whether EPA had "1) complied with

Petitioners therefore respectfully request that EPA correct its 2010 Lifecycle Analysis and 2011 Report to Congress, and subsequent disseminations of this information, to reflect objective, accurate, and useful information on the lifecycle emissions of ethanol and gasoline, as required by the Agency's Information Quality Guidelines.¹⁴

Part I of this Request for Correction of Information (RFC) identifies Petitioners' interest in the accuracy of EPA's information. Part II explains that EPA's lifecycle analysis is "influential information" subject to the Guidelines' most stringent standards. Part III summarizes the best available science on the GHG emission effects of corn ethanol and gasoline, and explains why EPA's 2010 Lifecycle Analysis is inaccurate. Part IV discusses the best available information on non-GHG "conventional" air pollution, and explains why EPA's 2010 and 2011 analyses are inaccurate. Parts III and IV begin with "upstream" emissions from feedstock production and fuel refining and move on to "downstream" emissions from fuel evaporation and combustion.

the reporting requirements of laws authorizing the Renewable Fuel Standard (RFS); and 2) updated the lifecycle analysis supporting the RFS with findings from the statutorily mandated National Academy of Sciences 2011 study on biofuels, the EPA's 2011 Report to Congress on the Environmental Impacts of Biofuels, as well as any subsequent reports or relevant research on lifecycle impacts." Memorandum from Patrick Gilbride, Director, Science, Research, and Management Integrity Evaluations, Office of Program Evaluation, Office of Inspector General, to Janet McCabe, Acting Assistant Administrator, Office of Air and Radiation (Oct. 15, 2015), *available at* <http://1.usa.gov/1LSDIRi>. Although the OIG has yet to conclude its investigation, it is clear that EPA has failed to update its lifecycle analysis or to meet its reporting obligations under EISA.

¹⁴ See EPA, Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility and Integrity of Information Disseminated by the Environmental Protection Agency (Oct. 2002) [hereinafter Information Quality Guidelines], *available at* <http://1.usa.gov/1LRLCF7>.

I. PETITIONERS' INTEREST IN EPA'S LIFECYCLE ANALYSIS

The Energy Future Coalition is a bipartisan public policy initiative that brings together business, labor, and environmental leaders to address challenges and opportunities in the transition to cleaner energy technologies. The Energy Future Coalition seeks to identify and advance innovative policy options that appeal to a diverse array of competing interests and attract broad political support.

Urban Air Initiative is a group of concerned citizens, non-profit groups, agriculture organizations, businesses of all types, and other stakeholders determined to reduce the threat to public health posed by our use of petroleum-based fuels, especially in urban areas where citizens are exposed to mobile source emissions at dangerous levels.

The Governors' Biofuels Coalition is a group of twenty-one state governors who believe that clean-burning biofuels can decrease the nation's dependence on imported energy resources, improve public health and the environment, and stimulate the national economy.¹⁵ The Governors' Biofuels Coalition supports activities designed to (i) educate the public and demonstrate the benefits of biofuels; (ii) promote research and market developments to develop biofuel production and use; and (iii) encourage investments in infrastructure to support expansion of the alternative fuels market.

EPA's continuing dissemination of inaccurate information in its 2010 Lifecycle Analysis and its 2011 Report to Congress frustrate Petitioners' mutual interest in advancing a clean, low-carbon energy future while reducing urban pollution.

¹⁵ The members of the Governors' Biofuels Coalition include the governors of Alabama, Arkansas, Colorado, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Maryland, Minnesota, Missouri, Montana, Nebraska, New York, Ohio, Oregon, South Dakota, Tennessee, Washington, and Wisconsin.

II. THE AGENCY’S INFORMATION QUALITY GUIDELINES REQUIRE THAT EPA’S 2010 LIFECYCLE ANALYSIS AND EPA’S 2011 REPORT TO CONGRESS MEET HIGH STANDARDS OF OBJECTIVITY AND UTILITY.

Pursuant to the Information Quality Act¹⁶ and the implementing guidelines of the Office of Management and Budget,¹⁷ EPA promulgated its own Information Quality Guidelines.¹⁸ Those Guidelines reflect the Agency’s goal that “[d]isseminated information should adhere to a basic standard of quality, including objectivity, utility, and integrity.”¹⁹

For information to be objective, it must be “accurate, reliable, and unbiased,” and it must “be[] presented in an accurate, clear, complete, and unbiased manner.”²⁰ To meet the “utility” standard, information must be “useful[] . . . to its intended users—here, Congress, the regulated community, and the Agency’s decision-makers.”²¹

¹⁶ Pub. L. 106-554, § 1(a)(3), 114 Stat. 2763, 2763A-153 (Dec. 21, 2000) (codified at 44 U.S.C. § 3516 note) (requiring OMB to promulgate guidelines that “require that each Federal agency . . . issue guidelines ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by the agency” and “establish administrative mechanisms allowing affected persons to seek and obtain correction of information maintained and disseminated by the agency that does not comply with the [OMB] guidelines.”).

¹⁷ Office of Management and Budget, Information Quality Guidelines (Oct. 1, 2002), *available at* http://www.whitehouse.gov/sites/default/files/omb/inforeg/iqg_oct2002.pdf.

¹⁸ Information Quality Guidelines, *supra* note 14.

¹⁹ *Id.* at 3.

²⁰ *Id.* at 15.

²¹ *Id.*; *see also* Exec. Order No. 13,563, 6 Fed. Reg. 3821, 3821 (Jan. 18, 2011) (noting that when regulating, an agency must use “the best available science” and “the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible.”).

A. EPA's 2010 Lifecycle Analysis and its 2011 Report to Congress Are Information Subject to the Information Quality Guidelines.

EPA's Information Quality Guidelines apply to "information" that is "disseminated" by the Agency.²² EPA's 2010 Lifecycle Analysis and its 2011 Report to Congress qualify as "information," which is defined to include "any communication or representation of knowledge such as facts or data, in any medium or form."²³ As the Guidelines acknowledge, such "information" is "essential for assessing environmental and human health risks, designing appropriate and cost-effective policies and response strategies, and measuring environmental improvements."²⁴

Both the 2010 Lifecycle Analysis and the 2011 Report to Congress qualify as information "disseminated" by the Agency.²⁵ The 2010 Lifecycle Analysis is published on EPA's website,²⁶ and EPA continues to disseminate its emissions estimates in recent rules published in the Federal Register²⁷ and on EPA's public

²² Information Quality Guidelines, *supra* note 14, at 15.

²³ *Id.*

²⁴ *Id.* at 5.

²⁵ *Id.* at 15.

²⁶ EPA, Renewable Fuel Standard: Final Rule Additional Resources, <https://www.epa.gov/renewable-fuel-standard-program/renewable-fuel-standard-rfs2-final-rule-additional-resources>; *see also* 2010 RFS Rule, 75 Fed. Reg. at 14,670 ("EPA has established a docket for this action under Docket ID No. EPA –HQ–OAR–2005–0161. All documents in the docket are listed in the <http://www.regulations.gov> Web site.").

²⁷ *See, e.g.*, RFS Standards for 2014–2016, 80 Fed. Reg. at 7748 ("While some of these impacts were analyzed in the 2010 final rulemaking which established the current RFS program, we have not fully analyzed these impacts for the 2014, 2015, and 2016 volume requirements being established today.").

rulemaking docket.²⁸ Likewise, EPA disseminated the 2011 Report to Congress when the Agency submitted it to Congress for public deliberation,²⁹ and EPA continues to disseminate the Report on its website.³⁰

B. EPA’s 2010 Lifecycle Analysis and its 2011 Report to Congress Are “Influential” Information Subject to the Highest Standards of Quality.

The Agency’s Information Quality Guidelines adopt a graded approach, in which the applicable standard of quality depends upon the significance of the information in question. EPA’s 2010 Lifecycle Analysis is “influential” information for purposes of the Information Quality Guidelines and thus “should adhere to a rigorous standard of quality.”³¹

1. EPA’s analysis of ethanol’s emissions effects is “influential.”

First, EPA’s 2010 Lifecycle Analysis is presumptively “influential,” because it was disseminated, and continues to be disseminated, in support of “top Agency action”—namely, rules promulgated by the Agency under the “highly controversial” RFS program.³²

²⁸ See, e.g., Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass-Based Diesel Volume for 2017, <https://www.regulations.gov/-!documentDetail;D=EPA-HQ-OAR-2015-0111-3535>.

²⁹ See 2011 Report to Congress, *supra* note 7, at i.

³⁰ <https://cfpub.epa.gov/ncea/biofuels/recordisplay.cfm?deid=235881>.

³¹ Information Quality Guidelines, *supra* note 14, at 19–20.

³² *Id.* at 20 (defining “influential” information to include “[i]nformation disseminated in support of top Agency actions (i.e., rules . . .) [and] “issues that have the potential to result in major cross-Agency or cross-media policies, are highly controversial, or provide a significant opportunity to advance the Administrator’s priorities.”); *id.* (defining “Top Agency actions” as actions with “potentially great or widespread impacts on the private sector [or] the public” and “precedentsetting or controversial scientific . . . issues”).

Second, EPA's 2010 Lifecycle Analysis represents a "major work product," as it was subject to substantial external peer review, public workshops, and expert input by a variety of interest groups.³³

Third, the regulations that EPA continues to base on its 2010 Lifecycle Analysis are "Economically Significant actions," because they might well determine the fate of the billion dollar renewable fuels industry,³⁴ as EPA continues to set renewable fuel obligations in the future, including for years beyond 2022.³⁵

The 2011 Report to Congress qualifies as "influential" on its own terms and because it disseminates the estimates in the 2010 Lifecycle Analysis.³⁶ As EPA's official position on the environmental effects of biofuels, the peer-reviewed Report to Congress is used by the nation's legislators, academics, public agencies, and special-interest groups to advance public policy and legislation. Therefore, the Report continues to have "a clear and substantial impact on important public policies and private sector decisions."³⁷

³³ *Id.*; 2010 RFS Rule, 75 Fed. Reg. at 14,764 ("To ensure the Agency made its decisions for this final rule on the best science available, EPA conducted a formal, independent peer review of key components of the analysis.").

³⁴ Information Quality Guidelines, *supra* note 14, at 20 (defining "Economically Significant actions" as those "that are likely to have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, Tribal, or local governments or communities" (citing Exec. Order No. 12,866, 3 C.F.R. 638 (1994), *reprinted as amended in* 5 U.S.C. § 601 app. at 45-49 (2006))).

³⁵ In setting renewable fuel standards for calendar years beyond 2022, EISA directs the Administrator of the EPA to consider, among other factors, "the impact of the production and use of renewable fuels on the environment, including on air quality, climate change, conversion of wetlands, ecosystems, wildlife habitat, water quality, and water supply." 42 U.S.C. § 7545(o)(2)(B)(ii)(I). Moreover, after 2022 EPA is no longer required to calculate thresholds according to the 2005 petroleum baseline, so EPA should rationally base its regulations on the full lifecycle of gasoline as compared to alternative fuels.

³⁶ 2011 Report to Congress, *supra* note 7, at 1-2 (citing 2010 RFS RIA, *supra* note 1).

³⁷ Information Quality Guidelines, *supra* note 14, at 46.

2. Because it is influential, EPA’s lifecycle analysis must use the best available science.

Because EPA’s estimates of ethanol’s lifecycle emissions are “influential” information, they are “subject to a higher degree of quality . . . than information that may not have a clear and substantial impact on important public policies or private sector decisions.”³⁸

For influential air pollutant emissions estimates that involve “human health, safety or environmental risk assessments,” the Information Quality Guidelines provide that “EPA will ensure, to the extent practicable and consistent with Agency statutes and existing legislative regulations, the objectivity of such information disseminated by the Agency by applying the following . . . principles . . . :

- (A) The substance of the information is accurate, reliable and unbiased. This involves the use of:
 - (i) the best available science and supporting studies conducted in accordance with sound and objective scientific practices, including, when available, peer reviewed science and supporting studies; and
 - (ii) data collected by accepted methods or best available methods (if the reliability of the method and the nature of the decision justifies the use of the data).³⁹

Although the “best available science” standard “usually refers to the availability at the time an assessment is made,”⁴⁰ that general rule does not apply when EPA continues to re-disseminate and rely on its emissions estimates in

³⁸ *Id.*

³⁹ *Id.* at 22. Influential risk assessments must also be presented in a form that is “comprehensive, informative, and understandable.” *Id.*

⁴⁰ *Id.* at 23.

promulgating new major rules.⁴¹ Moreover, the Information Quality Guidelines “recognize[] that scientific information about risk is rapidly changing and that risk information may need to be updated over time,” especially when required by “statutes” (like EISA) and when “the updated risk assessment will have a clear and substantial impact on important public policies or private sector decisions.”⁴² In this case, EPA has already determined that its emissions estimates “need to be updated over time.”⁴³ The Agency said so explicitly when it initially disseminated the 2010 Lifecycle Analysis and 2011 Report to Congress.⁴⁴

For the reasons that follow, EPA’s lifecycle estimates do not satisfy even the basic requirements of objectivity, utility, and integrity applicable to all EPA-disseminated information—much less the heightened standards of information quality for influential risk assessments.

⁴¹ Under Executive Orders 13,563 and 12,866, the Agency must provide the public with an up-to-date and accurate analysis of the consequences of economically significant regulatory actions. *See* Exec. Order No. 13,563, 76 Fed. Reg. 3821 (Jan. 18, 2011); Exec. Order No. 12,866, 3 C.F.R. 638 (1994), *reprinted as amended in* 5 U.S.C. § 601 app. at 45-49 (2006). Executive Order 13,563 specifically requires the Agency to use “the best available science” and “the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible.” Exec. Order No. 13,563, 6 Fed. Reg. at 3821.

⁴² Information Quality Guidelines, *supra* note 14, at 23; *see supra* pp. 8–9 (explaining that EPA’s lifecycle analysis affects biofuel policy and investment).

⁴³ Information Quality Guidelines, *supra* note 14, at 23.

⁴⁴ *See* 2010 RFS RIA, 45 Fed. Reg. at 14,765 (“EPA recognizes that as the state of scientific knowledge continues to evolve in this area, the lifecycle GHG assessments for a variety of fuel pathways will continue to change.”); *id.* at 14,785 (“EPA is at the same time committing to further reassess these determinations and the lifecycle estimates.”); 2011 Report to Congress, *supra* note 7, at ix (“This initial report to Congress serves as a starting point for future assessments.”).

C. EPA’s 2010 Lifecycle Analysis and 2011 Report to Congress Do Not Meet the “Objectivity” or “Utility” Standards Under the Guidelines.

To meet EPA’s “objectivity” standard, the Agency’s information must be “accurate, reliable, and unbiased.”⁴⁵ But as Petitioners demonstrate in Parts III and IV of this RFC, EPA’s 2010 Lifecycle Analysis and its 2011 Report to Congress are not accurate or reliable sources of information. EPA continues to disseminate and rely on this information even though it was based on erroneous assumptions and does not account for significant improvements in modeling and more reliable data that have since become available.

The 2010 Lifecycle Analysis and the 2011 Report to Congress also do not meet the “utility” standard under the Guidelines—the information must be “useful for its intended users.”⁴⁶ Here, the primary intended users of the 2010 Lifecycle Analysis are EPA officials, who have an obligation to assess the costs and benefits of new regulations on the basis of the best available science. Because the information is inaccurate and outdated, the 2010 Lifecycle Analysis is no longer a useful tool to predict the consequences of the Agency’s decisions.

The primary intended user of the 2011 Report to Congress is Congress itself. Because EPA’s information is outdated, and EPA’s next report is overdue, the 2011 Report to Congress is no longer useful to make legislative policy decisions, the particular province of Congress.⁴⁷

⁴⁵ Information Quality Guidelines, *supra* note 14, at 15.

⁴⁶ *Id.*

⁴⁷ U.S. Const. art. I, § 1 (“All legislative powers herein granted shall be vested in a Congress of the United States, which shall consist of a Senate and a House of Representatives.”).

III. GREENHOUSE GAS EMISSIONS

In its 2010 Lifecycle Analysis, EPA concluded that by 2022, corn ethanol would achieve on average lifecycle greenhouse gas (GHG) emissions savings of only 21% compared to EPA's 2005 gasoline carbon intensity baseline of 93.01 grams of carbon dioxide equivalent per megajoule (g CO₂e/MJ).⁴⁸ Reviewing EPA's own data, a 2011 National Academy of Sciences Report on the RFS (NAS Report) cautioned that the RFS "might not achieve the intended GHG reductions" on a cumulative, as opposed to annualized, basis.⁴⁹

While EPA's findings were doubtful in 2010, they are now doubly so, given the wealth of newly available scientific and economic data that undermines EPA's 2010 Lifecycle Analysis.

For example, EPA's estimates of GHG emissions are flatly inconsistent with the subsequent findings of experts at the Department of Energy. As early as 2012, Argonne National Laboratory's (Argonne) Energy Division, which develops the annual Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model for comparing lifecycle GHG emissions,⁵⁰ estimated a much lower

⁴⁸ 2010 RFS Rule, 75 Fed. Reg. at 14,786 ("The results for this corn ethanol scenario are that the midpoint of the range of results is a 21% reduction in GHG emissions compared to the gasoline 2005 baseline. The 95% confidence interval around that midpoint ranges from a 7% reduction to a 32% reduction compared to the gasoline baseline."). EPA reported its carbon intensity baseline for 2005 gasoline as 98.205g CO₂e/mmBTU, which is equivalent to 93.01g CO₂e/MJ. 2010 RFS RIA, *supra* note 1, at 467.

⁴⁹ National Research Council, National Academy of Sciences, Renewable Fuel Standard: Potential Economic and Environmental Effects of U.S. Biofuel Policy 201 (2011) [hereinafter NAS Report].

⁵⁰ Argonne has devoted nearly two decades of expertise to researching lifecycle emissions, refining its GREET model every year to reflect improvements in accounting, newly available data, and peer reviewed science. See Michael Q. Wang et al., *Development and Use of the GREET Model to Estimate Fuel Cycle Energy Use and Emissions of Various Transportation Technologies and Fuels* DOE Argonne Nat'l Lab.; ARGONNE/ESD-31 (1996). The model is extremely influential and used by a

carbon intensity figure, taking into account land-use effects. Argonne estimated that GHG lifecycle emissions from corn ethanol were 19% to 48% lower than those of gasoline in 2012, even when including land-use change.⁵¹ This compares favorably with EPA's 2010 Lifecycle Analysis estimate of a 7% to 32% reduction in GHG emissions in 2022,⁵² and even more favorably with the 2010 Lifecycle Analysis of GHG emissions effects for 2012, which erroneously indicated that the RFS would increase emissions during its initial implementation.⁵³ Thus, only two years later, the foremost experts in lifecycle analysis estimated GHG reductions from ethanol an order of magnitude greater than those estimated by the Agency's 2010 Lifecycle Analysis.

And unlike the lifecycle GHG emissions of petroleum-based gasoline, which have been trending higher, the lifecycle emissions of ethanol are trending lower. A 2014 study by the National Renewable Energy Laboratory (NREL) notes that because of "green" innovation in the agriculture and biofuels industry, "the production and use of corn ethanol emitted 44% fewer GHG emissions, consumed 54% less fossil energy and required 44% less land in 2010 compared to 1990 on a life cycle basis."⁵⁴ These dynamic improvements in the ethanol industry highlight the

variety of regulatory agencies, including EPA. *See Rocky Mountain Farmers Union v. Corey*, 730 F.3d 1070, 1081–82 (9th Cir. 2013) (explaining the GREET model).

⁵¹ Michael Q. Wang et al., *Well-to-Wheels Energy Use and Greenhouse Gas Emissions of Ethanol from Corn, Sugarcane, Corn Stover, Switchgrass, and Miscanthus*, 7 Environ. Res. Lett., at 9 (2012). Argonne found that ethanol made from sugarcane, corn stover, switchgrass and miscanthus could reduce lifecycle GHGs even further—40–62%, 90–103%, 77–97%, and 101–115%, respectively. *Id.*

⁵² 2010 RFS Rule, 75 Fed. Reg. at 14,786. EPA's central estimate of corn ethanol's carbon intensity in 2022 was 79 kg CO₂e/mmbTU, equivalent to 74.82g CO₂e/MJ. *Id.* at 14,788.

⁵³ NAS Report, *supra* note 49, 201 (collecting EPA data from the 2010 RFS RIA showing initial positive emission values for the year 2012).

⁵⁴ Helena L. Chum et al., *Understanding The Evolution Of Environmental and Energy Performance of the U.S. Corn Ethanol Industry: Evaluation of Selected Metrics* 8 Biofuels, Bioproducts, & Biorefining 224 (March/April 2014).

importance of considering the most recent, updated evidence, as well as predicted industry trends, on an ongoing basis.

As described below, at every stage of their respective lifecycles—*i.e.*, corn agriculture and petroleum extraction, fuel refining, and finally, combustion in vehicle engines—the evidence shows that the carbon intensity of corn ethanol is trending lower than that of petroleum-based fuels. Section A will address land-use change. Sections B, C and D will address the other “upstream” emissions from corn agriculture and biorefinery operations compared to the corresponding stages of gasoline production. Section E will discuss “downstream” emissions at the tailpipe.

In short, the best available science shows that the information presented in EPA’s 2010 Lifecycle Analysis and 2011 Report to Congress are inaccurate. Corn ethanol is much less carbon-intensive than gasoline. One study puts the carbon impact of corn ethanol at 59.21g CO₂e/MJ, compared to 96.89g for gasoline.⁵⁵ As explained below, that represents a conservative estimate, as it does not incorporate new estimates of soil organic carbon sequestration—the amount of carbon stored in the soil by biomass.

A. Land-Use Change

New evidence has exposed significant flaws in EPA’s estimate of land-use change GHG emissions. Updated science on soil sequestration and empirical evidence of actual land-use patterns demonstrate that carbon emissions from land-use change are much lower than the estimate EPA continues to rely on and disseminate to the public.

⁵⁵ Susan Boland & Stefan Unnasch, Life Cycle Associates, GHG Emissions Reductions Due to RFS, LCA.6075.11 .2015, at 9 (2015).

This section summarizes the “first-generation” land-use change science and explains how new data and modeling undermine EPA’s 2010 Lifecycle Analysis, which inaccurately suggests that the RFS has increased GHG emissions.⁵⁶ That is not right. Current science suggests that the impact from land-use change due to ethanol production is negligible.

1. First-Generation Land-Use Studies

The interest in land-use change as a distinct topic in biofuel lifecycle analysis was sparked by a 2008 study by a team of scientists led by Timothy Searchinger.⁵⁷ Searchinger conjectured that an increased demand for corn would raise prices, which would in turn incentivize the conversion of forests and grassland to crop agriculture in the United States and elsewhere, releasing naturally stored CO₂ through land conversion.⁵⁸ Using FAPRI-CARD—the same model that EPA used to estimate international land-use change GHG emissions⁵⁹—Searchinger predicted that the carbon intensity value for land-use change induced by biofuels was a whopping 104g CO₂e/MJ⁶⁰—more than the entire lifecycle carbon intensity of baseline gasoline.⁶¹ If true, this would mean that on a lifecycle basis corn ethanol has nearly *double* the GHG emissions of gasoline.⁶²

⁵⁶ NAS Report, *supra* note 49, at 202.

⁵⁷ Timothy Searchinger et al., *Use of U.S. Croplands for Biofuels Increases Greenhouse Gases Through Emissions from Land-Use Change*, 319 Science 1238 (2008).

⁵⁸ *Id.*

⁵⁹ 2010 RFS Rule, 75 Fed. Reg. at 14,768; 2010 RFS RIA, *supra* note 1, at 302.

⁶⁰ Searchinger, *supra* note 57, at 1239.

⁶¹ EPA’s baseline gasoline carbon intensity for the year 2005 was 98.205g CO₂e/mmBTU (or 93.01g CO₂e/MJ). 2010 RFS RIA, *supra* note 1, at 467..

⁶² Searchinger estimated ethanol’s total lifecycle GHG emissions to be 93% greater than gasoline’s. Searchinger, *supra* note 57, at 1239.

Only two years later, even while land-use change science was rapidly improving in response to Searchinger's controversial study, EPA's 2010 Lifecycle Analysis estimated overall corn-ethanol land-use change emissions in 2022 at 30kg CO₂e/mmBtu, equivalent to 28.5g CO₂e/MJ.⁶³

The estimates reported in these early analyses were never accurate, and they are not supported by the best available science.

Parameters related to yield improvement, land displacement, and the type of land converted are key drivers of modeled GHG emissions from land-use change,⁶⁴ but early analyses of land-use change—including EPA's own analyses—failed to accurately reflect these complexities. For example, EPA did not account for many of the fallow or marginal agricultural lands that could be converted to grow corn, or the potential for growing multiple harvests on a single piece of land ("double cropping"). Later models of indirect land-use change have included "a more detailed assessment of yield improvement, land cover type, soil carbon stocks, and other parameters," resulting in significantly lower estimates of land-use change emissions.⁶⁵

Most importantly, empirical data has discredited early model assumptions on forest conversion: Contrary to EPA's predictions, ethanol has not increased the global rate of deforestation.⁶⁶ For this and other reasons, over the years the scientific

⁶³ 2010 RFS Rule, 75 Fed. Reg. at 14,788; *see also* NAS Report, *supra* note 49, at 193–194.

⁶⁴ NAS Report, *supra* note 49, at 191. For an early criticism of Searchinger, see Michael Q. Wang & Zia Haq, *Response to February 7, 2008 Scienceexpress Article*, available at <http://bit.ly/1phwhEa>.

⁶⁵ Boland & Unnasch, *supra* note 55, at 20.

⁶⁶ *Id.* at 19; *see also* 2010 RFS RIA, *supra* note 1, at 351 ("For instance, in 2022, as demand for corn ethanol increases in the corn ethanol scenario . . . total cropland pasture decreases by 0.9 million acres . . . [and] forestland decreases by 0.03 million acres.").

community has rejected EPA's estimate for land-use change emissions from corn ethanol as unrealistically high as compared with real-world data.⁶⁷

For example, an influential land-use change model developed by a network of economists associated with the Global Trade Analysis Project (GTAP) at Purdue, has consistently estimated lower emissions from land-use change than EPA. An initial study led by Professor Thomas Hertel in 2010 estimated a carbon intensity value of 27g CO₂e/MJ for corn ethanol with an upper bound of 90g and a lower bound of 14.7g, assuming an increase of 13.2 billion gallons of ethanol.⁶⁸ A subsequent GTAP/Purdue study in 2010 used the same data but refined the GTAP model to include more realistic assumptions about land types, land conversion rates, and the response of crop yields to prices.⁶⁹ Applying these assumptions, Purdue projected a carbon intensity value of 14g CO₂e/MJ for land-use change in 2022 due to corn-ethanol expansion under the RFS, a fraction of EPA's annualized estimate

⁶⁷ 2010 RFS Rule, 75 Fed. Reg. at 14,785–86. Although the actual results of these studies may not always be readily compared (given the different target years and production volumes modeled), the key point is that refined models predict lower carbon intensity values for land-use change than those predicted by EPA.

⁶⁸ Thomas W. Hertel et al., *Effects of U.S. Maize Ethanol on Global Land-use and Greenhouse Gas Emissions: Estimating Market-Mediated Responses*, 60 BioScience 223 (2010). EPA's own land -use change assessment primarily relied on outdated economic models developed by the Food and Agricultural Policy and Research Institute, as maintained by the Center for Agricultural and Rural Development (FAPRI-CARD) and the Forestry and Agricultural Sector Optimization Model (FASOM) developed by Texas A&M. The agency used FAPRI-CARD to model international land-use emissions, and FASOM to model domestic emissions. 2010 RFS Rule, 75 Fed. Reg. at 14,768. EPA also "opted to use the GTAP model to inform the range of potential GHG emissions associated with land use change resulting from an increase in renewable fuels." *Id.* at 14,781. All of these models have now been updated, but EPA has not revised its previous estimates to reflect model updates.

⁶⁹ The study estimated that every thousand gallons of ethanol produced would require an increase of 0.32 acres of cropland, with 24% of the associated land -use change occurring in the United States. Of these 0.32 acres, Tyner estimated that 33% of the added cropland would be converted forest, and 67% would be converted grassland. For an explanation of the refinements, see Wallace E. Tyner et al., *Land-use Changes and Consequent CO₂ Emissions due to US Corn Ethanol Production: A Comprehensive Analysis: Final Report* (April, 2010), available at <http://1.usa.gov/1Tt8Y6v>.

for 2022. Purdue’s estimate might seem low by comparison, but it is in fact much higher than current, updated estimates.⁷⁰

To be sure, when EPA conducted its 2010 Lifecycle Analysis, the science of land-use change was in its infancy—there remained substantial uncertainty in models of soil organic carbon and in economic models of global land-use change.⁷¹

Reviewing EPA’s 2010 Lifecycle Analysis and other lifecycle studies that included land-use change, the NAS Report concluded that “additional data are needed.”⁷² “In coming years,” the NAS Report predicted, “scientists will undoubtedly continue to refine their models to improve estimates of GHG emissions from land-use changes.”⁷³

After several years of biofuels policy, this “additional data” is now readily available. Updated economic models of land-use change uniformly predict lower lifecycle emissions. There is no reason for EPA to continue disseminating and relying on its erroneous estimates.

2. Second-Generation Land-Use Studies

Since EPA’s 2010 Lifecycle Analysis, more accurate lifecycle emission models have shown that initial estimates of emissions from first-generation land-use

⁷⁰ See *infra* pp. 19–25.

⁷¹ See NAS Report, *supra* note 49, at 5, 245.

⁷² NAS Report, *supra* note 49, at 190. In its 2010 RFS Rule, EPA committed itself to seek further input from the NAS Report and other experts on its lifecycle analysis. 2010 RFS Rule, 75 Fed. Reg. at 14,785 (“As part of the ongoing effort, we will ask for the expert advice of the National Academy of Sciences as well as other experts and then reflect this advice and any updated information in a new assessment of the lifecycle GHG emission performance of the biofuels being evaluated today. EPA will request that the National Academy of Sciences evaluate the approach taken in this rule, and the underlying science of lifecycle assessment and in particular indirect land use change, and make recommendations for subsequent rulemakings on this subject.”).

⁷³ *Id.* at 192.

studies were too high.⁷⁴ As one recent study explained, “prior to the last couple of years, there was insufficient data on global land-use change during the biofuels boom era. However, now we have that data, and it can be used to better calibrate prior estimates of land-use change.”⁷⁵ Accordingly, economists have recalibrated their models.⁷⁶ Argonne’s most recent peer-reviewed estimate for the carbon intensity of land-use change is 7.6g CO₂e/MJ for corn ethanol.⁷⁷ However, Argonne scientists have opined that, in light of GTAP model refinements, a more realistic estimate is 3.2g CO₂e/MJ.⁷⁸ As explained below,⁷⁹ even this estimate is too high, because it is based on the inaccurate assumption that all corn ethanol is grown with conventional tilling practices.⁸⁰

a. Argonne’s 2013 Estimate for Land-Use Change

REET’s updated carbon intensity value for land-use change is based upon an influential peer-reviewed study led by Argonne’s Jennifer Dunn, published in 2013.⁸¹ The study predicts significantly lower lifecycle CO₂ emissions than most

⁷⁴ See, e.g., Jennifer B. Dunn et al., *Land-use change and greenhouse gas emissions from corn and cellulosic ethanol*, 6 Biotech. for Biofuels 51 (2013).

⁷⁵ See, e.g., Farzad Taheripour & Wallace E. Tyner, *Biofuels and Land-use Change: Applying Recent Evidence to Model Estimates*, 3 Appl. Sci. 14, 15 (2013).

⁷⁶ See, e.g., Holly Gibbs et al., *New Estimates of Soil and Biomass Carbon Stocks for Global Economic Models*, Global Trade Analysis Project (GTAP) Tech. Paper No. 33 (2014), available at <http://bit.ly/1TuJq98>.

⁷⁷ Boland & Unnasch, *supra* note 55, at 6.

⁷⁸ See Jennifer B. Dunn et al., DOE Argonne Nat’l Lab., *Carbon Calculator for Land Use Change from Biofuels Production*, ANL/ESD/12-5, at 21, available at <http://1.usa.gov/1M84WIT>.

⁷⁹ See *infra* pp. 25–28.

⁸⁰ Dunn et al., *supra* note 78, at 21.

⁸¹ Dunn et al., *supra* note 74.

previous estimates, mostly as a result of refined modeling of soil organic carbon and refinements in the GTAP model.⁸²

Soil organic carbon and the carbon sequestration rate of biomass are crucial parameters in land-use change models; together, these factors determine: (1) how much carbon is stored in an ecosystem before a “disturbance” (like conversion to cropland) releases some of the carbon; (2) how much carbon is released by a given disturbance; and (3) how much (and how fast) carbon is stored again in the soil over the years.⁸³

Previous land-use change model assumptions of soil organic carbon and carbon sequestration, however, had been based on unrepresentative soil samples.⁸⁴

Argonne addressed these shortcomings. Using the GTAP land-use change model in combination with refined soil organic carbon models,⁸⁵ Argonne estimated that corn ethanol land-use changes contributed a carbon intensity of 7.6g CO₂e/MJ to ethanol’s lifecycle GHG emissions—with a possible range of 4.7g to 11g.

Another recent Argonne study on soil organic carbon points out an additional flaw in the first-generation land-use change models. These models relied on soil

⁸² *Id.* at 3. The updated GREET model’s assumptions are explained in detail in previous Argonne publications. See Ho-Young Kwon et al., *Modeling State-Level Soil Carbon Emission Factors Under Various Scenarios for Direct Land-use Change Associated with United States Biofuel Feedstock Production*, 55 Biomass & Bioenergy, 299–310 (2013). Argonne studies used the CENTURY model, which has been validated for use in analyzing different land types, at different soil levels. For a summary of Century, see Zhangcai Qin et al., DOE Argonne Nat’l Lab., *Incorporating Agricultural Management Practices into the Assessment of Soil Carbon Change and Lifecycle Greenhouse Gas Emissions of Corn Stover Ethanol Production*, ARGONNE/ESD-15/26 (2015).

⁸³ Dunn et al., *supra* note 74, at 5–6. This process may be roughly analogized to a loan; the initial disturbance is a “debt” which must be “paid back” over a limited period; the “foregone” carbon sequestration determines the amount of “interest” that must be paid on the “debt;” and biomass sequestration “pays back” the debt, as the soil returns to a carbon equilibrium. *Id.*

⁸⁴ *Id.* at 2.

⁸⁵ Dunn, *supra* note 74, at 2.

carbon data from unjustifiably shallow soil samples; deeper soil samples reveal higher sequestration rates for corn and other biofuel crops, because the roots of the corn plant store carbon deep in the soil.⁸⁶ Moreover, past models failed to properly account for the rate at which new cropland can restore carbon released by its initial conversion. Previous models assumed uniform sequestration rates over the years, and tended to measure land-use change according to arbitrary time frames (for example, 30 years).⁸⁷

b. GTAP's Model Update

Argonne's 2013 estimate for land-use change was too high because it relied on an old version of GTAP to model the economics of land-use change. Both GTAP economists and Argonne scientists have now acknowledged that the old GTAP model was inaccurate. The new GTAP model predicts lower land area changes, particularly in high-carbon forests. As a result, land-use change emissions estimates relying on GTAP have to be lower.

As GTAP economists have explained, the costs of converting existing pasture or forests to cropland are not the same; generally it is less expensive to convert pasture.⁸⁸ And it is even less expensive to simply switch crops on existing cropland. This difference in cost is influenced by regulatory barriers. For example, the RFS *excludes* from its definition of “renewable fuel” any fuel produced from crops grown on land that was not actively managed or fallow before enactment of the Energy

⁸⁶ Zhangcai Qin et al., *Soil Carbon Sequestration and Land-use Change Associated With Biofuel Production: Empirical Evidence*, GCB Bioenergy (2015), available at <http://bit.ly/1USWULe>. EPA believed its own choice of 30 year time frame was reasonable. 2010 RFS Rule, 75 Fed. Reg. at 14,780.

⁸⁷ Qin et al., *supra* note at 86, at 2. The NAS Report noted this problem as well. See NAS Report, *supra* note 49, at 197. EPA believed its own choice of a 30 year time frame was reasonable. 2010 RFS Rule, 75 Fed. Reg. at 14,780.

⁸⁸ Taheripour & Tyner, *supra* note 75, at 16.

Independence and Security Act of 2007.⁸⁹ Federal regulations in turn place onerous record-keeping requirements on biofuel producers, requiring them to prove that their biomass is not derived from converted forests.⁹⁰

Despite these regulatory and economic barriers, previous land-use models assumed it would cost the same to convert forest or pasture into croplands.⁹¹ Recognizing this significant flaw, Purdue has updated the GTAP model to factor in the higher costs of converting forests into cropland in most countries.⁹² Purdue has also updated GTAP to reflect the declining historical rates of conversion from forest to cropland.⁹³

As a result of these changes, the GTAP model now projects “less expansion in global cropland due to ethanol expansion”; a “lower U.S. share in global cropland expansion”; and a “lower forest share in global cropland expansions.”⁹⁴ According to Argonne, this new version of GTAP reduces corn ethanol “land-use change GHG emissions by 3g CO₂e/MJ,” resulting in an overall land-use change carbon impact estimate of 3.2g CO₂e/MJ, assuming conventional tilling practices.⁹⁵ When

⁸⁹ Pub. L. No. 109-58, § 201(I)(i), 121 Stat. 1492.

⁹⁰ Jody M. Endres, *Barking up the Wrong Tree? Forest Sustainability and Emerging Bioenergy Policies*, 37 Vt. L. Rev. 1, 9 (2013).

⁹¹ Taheripour & Tyner, *supra* note 75, at 16.

⁹² *Id.* at 27 (“In the real world often it is not as easy or inexpensive to convert forest to cropland as pasture. For example, farmers frequently switch back and forth from pasture and grassland to crop production and vice versa in the Northern Plains regions of the USA (including parts of Iowa, Minnesota, North Dakota, South Dakota and Montana) where converting grasslands to crop production and vice versa is not costly. However, transforming managed forests to cropland is not a common practice.”).

⁹³ Purdue uses FAOSTAT harvested land data, which does not account for double or triple cropping, but Purdue attempts to correct for this bias. *Id.* at 19.

⁹⁴ *Id.*

⁹⁵ See Jennifer B. Dunn et al., DOE Argonne Nat’l Lab., Carbon Calculator for Land Use Change from Biofuels Production, ANL/ESD/12-5, at 21, <http://1.usa.gov/1R8tummy>. Indeed,

accounting for reduced tillage or no-till farming, Argonne further reduces the land-use change emissions of corn ethanol to 2.89g and 2.15g CO₂e/MJ, respectively.⁹⁶ EPA's 2010 Lifecycle Analysis does not reflect this improved modeling.

c. New Land-Use Data

New empirical data on land-use change shows that previous models substantially overestimated land-use change, by orders of magnitude. When real-world data does not fit the model, the model is wrong.

Despite increases in commodity prices and a 10-billion-gallon increase in domestic ethanol production, recent USDA data for the United States illustrates “that while corn acreage has increased in parallel with the build-up of the corn ethanol industry between 2004 and 2013, total principal crop acreage has remained fairly constant and constituted 311 million acres in 2013.”⁹⁷ Corn grown as biomass has largely replaced other croplands, not forests or grasslands. Contrary to original predictions, there has been no significant increase in U.S. cropland acreage despite commodity price increases.⁹⁸

As Bruce Babcock and Zabid Iqbal have shown in a recent empirical study of land-use change, increases in food crop production across the globe have been driven by crop “intensification”—increased yields per acre and double or triple cropping—

domestic land-use emissions are negative, as a result of increased sequestration (1.9g CO₂e/MJ). Only international land-use emissions are positive, at about 5.1g, summing up to 3.2g. *Id.*

⁹⁶ See GREET1_2015 (summarized in Appendix I, *infra* p. 69).

⁹⁷ Michael Wang & Jennifer B. Dunn, *Comments on Avoiding Bioenergy for Food Crops and Land by Searchinger and Heimlich*, at 2 (February 6, 2015), available at <http://1.usa.gov/1RB1E2F>.

⁹⁸ Indeed, transitions from other crops to corn may actually be reducing atmospheric carbon, because, depending on the geographic region, as well as soil and yield conditions, corn soils may sequester comparatively more carbon than other crops. As Argonne found in a recent analysis, soil organic carbon “increased 15–23%” in general crop to corn transitions. Qin et al., *supra* note 86, at 2.

not extensive conversions to croplands.⁹⁹ Past models used to estimate land-use changes, like the FAPRI-CARD model EPA used in its 2010 Lifecycle Analysis,¹⁰⁰ relied on historical harvest data that did not take into account the “non-yield” intensification of cropland, through techniques like double cropping.¹⁰¹ Thus, EPA overstated the carbon intensity of corn ethanol. And even when new acres have been devoted to corn, “the type of land converted to accommodate biofuels was not forest or pastureland but rather cropland that did not go out of production.”¹⁰²

In sum, the erroneous assumptions embedded in EPA’s land-use change models overstated the extent of land-use change and its effect on GHG emissions.¹⁰³

B. Corn Agriculture

1. Soil Organic Carbon

a. Agricultural Management Practices

Since EPA’s 2010 Lifecycle Analysis, new evidence shows that improved agricultural practices have substantially increased soil carbon sequestration, reducing the carbon intensity of ethanol. In fact, recent soil analyses suggest that corn soils in

⁹⁹ Bruce A. Babcock & Zabid Iqbal, *Using Recent Land-use Changes to Validate Land-use Models*, 14-SR 109, at 31 (2014). Global data shows that there has been a very minor increase in cropland acreage when compared to global crop intensification. The authors estimated that the intensive response—the increase in acreage productivity—has been 15 times larger than the increase in acreage. *Id.* at 17.

¹⁰⁰ 2010 RFS Rule, 75 Fed. Reg. at 14,768; 2010 RFS RIA, *supra* note 1, at 302.

¹⁰¹ Babcock & Iqbal, *supra* note 99, at 30 (concluding that “existing estimates of greenhouse gas emissions caused by land conversions due to biofuel production are too high because they are based on models that do not allow for increases in non-yield intensification of land-use.”).

¹⁰² *Id.* at 26.

¹⁰³ *Id.*

certain areas of the Corn Belt are a net carbon “sink,” sequestering more carbon than the amount of CO₂ release during the production of corn.

As mentioned above, soil sequestration is an important factor in estimating the lifecycle emissions of corn ethanol. Growing plants decreases atmospheric carbon by sequestering carbon into the soil, which results in a carbon “credit” in a proper lifecycle analysis.¹⁰⁴ Moreover, corn is part of small subset of “C₄ plants”—named after the 4-carbon molecule present in these plants—which photosynthesize CO₂ more efficiently than “C₃ plants” do.¹⁰⁵ Crop yields also have an effect on carbon sequestration: Higher yields generally correlate with increased amounts of carbon stored in the soil, because above-ground biomass is roughly equal to below ground biomass. Thus, when corn, a crop that yields 10.5 tons per hectare, displaces soybeans with a yield of 3 tons per hectare, significantly more carbon is sequestered.¹⁰⁶

The actual effect of agricultural management practices on soil organic carbon has, until recently, been underestimated.

For example, reviewing the studies available as of 2011, the NAS Report suggested that the effect of no-till and reduced tillage practices on soil organic carbon sequestration rates “is inconsistent and depends on the depth of soil sampling and crop management.”¹⁰⁷ According to the NAS Report, studies that assessed the carbon content of the entire soil profile (0–60cm) “did not find higher soil carbon in no-till

¹⁰⁴ See, e.g., Qin et al., *supra* note 82.

¹⁰⁵ See generally, Colin P. Osborne & David J. Beerling, *Nature’s Green Revolution: The Remarkable Evolutionary Rise of C₄ Plants*, *Philosophical Transactions of the Royal Soc’y B* 173, 173 (2006).

¹⁰⁶ See A.J. Lorenz et al., *Breeding Maize for a Bioeconomy: A Literature Survey Examining Harvest Index and Stover Yields and their Relationship to Grain Yield* 50 *Crop Sci.* 1 (2010).

¹⁰⁷ NAS Report, *supra* note 49, at 186.

fields than in conventionally tilled fields.”¹⁰⁸ Perhaps for this reason, EPA’s 2010 Lifecycle Analysis only included soil carbon for the top 30cm of soil, and did not include no-till or reduced-tillage estimates.¹⁰⁹

New evidence, however, shows that agricultural management practices like no-till have a substantial effect on soil organic carbon. A subsequent multiyear study of South Dakota soil samples, led by soil scientist David Clay, found clear evidence that no-tillage practices (and higher corn yields) increase carbon sequestration. The study used laboratory surface soil samples submitted by agricultural producers,¹¹⁰ recording information on their agricultural practices, fertilizer use, and expected yield associated with the samples. The study also used benchmark soil samples to estimate the change in soil carbon sequestration associated with improved agricultural practices (higher yields, and no-till farming).

From the laboratory results, Clay concluded that many of the cropland soils studied were now net “carbon sinks,” thanks, in part, to the adoption of reduced tillage and no-tillage practices, as well as increased crop yields over the years.¹¹¹ Clay found that surface soil carbon sequestration reduces the carbon intensity of corn ethanol by as much 19.6g CO₂e/MJ in the North-Central and Southeast regions of North Dakota.¹¹²

¹⁰⁸ *Id.*

¹⁰⁹ 2010 RFS RIA, *supra* note 1, at 396, 415.

¹¹⁰ See David E. Clay et al., *Corn Yields and No-Tillage Affects Carbon Sequestration and Carbon Footprints*, 104 *Agron. J.* 763 (2012) [hereinafter Clay et al., *Carbon Sequestration*]; see also David Clay et al., *Tillage and Corn Residue Harvesting Impact Surface and Subsurface Carbon Sequestration*, 44 *J. Environ. Qual.* 803 (2015) [hereinafter Clay et al., *Tillage and Corn Residue*].

¹¹¹ Clay, *Carbon Sequestration*, *supra* note 110, at 769.

¹¹² *Id.*

The study's estimate of the carbon footprint of corn, however, was based on surface samples that missed the soil organic carbon sequestration occurring even deeper in the soil. Studies testing deeper soil levels have shown that certain corn soils may sequester more carbon than previously thought.

For example, a 2012 USDA study collected soil samples from as deep as 150 cm below the surface of experimental no-till fields in Nebraska, measuring changes in soil organic content over nine years.¹¹³ The study found that improved agricultural management practices can double or even quadruple total soil organic carbon when deep soil is taken into account.¹¹⁴ The study found average annual increases of more than 2 megagrams (tons) of soil organic carbon per hectare, with over 50% of the carbon being sequestered deeper than 30 cm in the soil profile.¹¹⁵ The sequestration rates found by the study “greatly exceed the soil carbon credits that have been used in modeling studies to date for maize and switchgrass grown for bioenergy.”¹¹⁶ Other recent USDA peer-reviewed studies have reached similar results.¹¹⁷

In light of these studies, corn ethanol would receive a significant soil sequestration credit in a properly executed lifecycle analysis. Although the precise value is uncertain (soil sequestration credit values range from about 18.19g to 178.47g CO₂e/MJ, depending on the soil depth analyzed and other factors),¹¹⁸ even a low-end credit of only 18.19g would bring GREET's current lifecycle estimate for

¹¹³ Ronald F. Follett et al., *Soil Carbon Sequestration by Switchgrass and No Till Maize Grown for Bioenergy*, 5 *Bioenerg. Research* 866, 867 (2012), available at <http://bit.ly/1QIHAPv>.

¹¹⁴ *Id.* at 867.

¹¹⁵ *Id.* at 873.

¹¹⁶ *Id.*

¹¹⁷ Ardel D. Halvorson & Catherine E. Stewart, *Stover Removal Affects No-Till Irrigated Corn Yields, Soil Carbon, and Nitrogen*, 107 *Agron. J.* 1504 (2015).

¹¹⁸ See Appendix II, *infra* p. 73.

corn ethanol down to 36.62g CO₂e/MJ, less than half the carbon intensity of gasoline.

2. Nitrogen Fertilizer

Agriculture is the main source of nitrous oxide emissions in the United States. EPA estimates that 68% of total emissions of nitrous oxide (N₂O) result from farming soil management practices.¹¹⁹ Because N₂O is a powerful GHG pollutant, it accounts for a significant portion of the lifecycle emissions of corn ethanol (17g CO₂e/MJ).¹²⁰ Most N₂O is released primarily through the chemical process of microbial “nitrification” and “denitrification” that is stimulated when nitrogen fertilizer application exceeds plant needs.¹²¹

In 2005, USDA estimated that 95% of corn acreage received nitrogen fertilizer inputs, at an average rate of 138 lbs per acre.¹²² Taking into account corn yield increases, however, N₂O emissions per bushel have fallen by more than 20% since the 1990s,¹²³ thanks in part to new technologies such as nitrogen stabilizers, controlled release nitrogen, soil testing and remote sensing, and the use of GPS

¹¹⁹ *Id.* at 185.

¹²⁰ According to Argonne’s 2012 calculations, fertilizer N₂O application accounted for 17g CO₂e/MJ, and fertilizer production accounted for 10g CO₂e/MJ, of the total carbon intensity value of ethanol. See Michael Q. Wang et al., *Well-to-Wheels Energy Use and Greenhouse Gas Emissions of Ethanol from Corn, Sugarcane, and Cellulosic Biomass for US Use*, 7 Environ. Res. Lett. 045905, at 9 (2012).

¹²¹ NAS Report, *supra* note 49, at 185.

¹²² *Id.* 187.

¹²³ 2008 Energy Balance for the Corn Ethanol Industry, USDA, Table 2 (June, 2010).

tracking technologies.¹²⁴ But many GHG lifecycle models have not been updated to reflect the pace of industry-wide innovation.¹²⁵

C. Ethanol Production

Since EPA's 2010 Lifecycle Assessment was first disseminated, biorefineries have become much more efficient, using less natural gas and electricity to produce each gallon of ethanol. New co-products that substitute for other products in the market have also reduced the proportion of GHG emissions that can properly be attributed to ethanol.

1. Biorefinery Energy Efficiency

As the NAS Report points out, the bulk of GHG emissions from the typical biorefinery result from natural gas and electricity usage.¹²⁶ Ethanol biorefineries, however, have experienced dramatic gains in energy efficiency in the past few years.¹²⁷ Dry mill ethanol plants have improved plant-wide energy consumption and thermal integration.¹²⁸ Improvements in "[e]nergy efficiency and fuel switching . . . reduce the [carbon intensity] of corn ethanol."¹²⁹

¹²⁴ See Steffen Mueller & John Kwik, 2012 Corn Ethanol, Emerging Plant Energy and Environmental Technologies (2013); *Public Hearing for the 2014, 2015, and 2016 Standards for the Renewable Fuel Standard Program*, Kansas City, KS, Testimony of Iris Caldwell & Steffen Mueller, available at <http://bit.ly/1QMnnoL>.

¹²⁵ *Id.*

¹²⁶ NAS Report, *supra* note 49, at 199.

¹²⁷ See generally Mueller & Kwick, *supra* note 124 (discussing industry gains in energy and process efficiency).

¹²⁸ More energy-intensive wet mill plants have become increasingly scarce. Today, it is estimated that "[d]ry mill plants correspond to 83% of U.S. capacity and have experienced a 90% growth in production since 2000. Wet mill plants today account for only 10 to 12% of installed capacity, and less than 10% of the total number of plants."¹²⁸ Boland & Unnasch, *supra* note 49, at 18.

¹²⁹ *Id.* at viii.

Most biorefineries have completed the switch from coal to less carbon-intensive natural gas.¹³⁰ By 2012, only 13% of U.S. ethanol production capacity used coal as a thermal energy source.¹³¹ Ethanol plants have also dramatically reduced their energy needs (and electricity demand) through innovation. From 36,000 Btu per gallon of ethanol in 2000, biorefineries have reduced their energy consumption to less than 24,000 Btu on average for 2012, and less than 20,000 Btu for some biorefinery configurations.¹³² Moreover, biorefinery yields have increased by about 10% in the last 20 years, so a bushel of corn produces more ethanol.¹³³

As reflected by Argonne's most recent GREET model, reductions in energy use and improved biorefinery yields translate into a reduced carbon intensity value for corn ethanol.¹³⁴ These reductions will grow in the future due to the increasing use of lignin (corn residue) to substitute for natural gas, and other biorefinery process innovations.¹³⁵

¹³⁰ In general, using natural gas to power biorefineries has lower GHG emissions than using coal, and using biomass may have lower emissions still. NAS Report, *supra* note 49, at 195.

¹³¹ Mueller & Kwick, *supra* note 124, at 1.

¹³² See *id.* at iv–v; Hosein Shapouri et al., USDA, The Energy Balance of Corn Ethanol: An Update, AER-814 (2001).

¹³³ 2008 Energy Balance for the Corn Ethanol Industry, USDA, Table 2 (June, 2010).

¹³⁴ See Zhichao Wang et al., Updates to the Corn Ethanol Pathway and Development of an Integrated Corn and Corn Stover Ethanol Pathway in the GREET Model, ANL/ESD-14/11, at 3 (2014).

¹³⁵ *Id.* at 1 (“Co-located corn stover and corn ethanol plants have the potential to reduce the costs, energy consumption, and [GHG] emissions of ethanol production because these facilities could burn the corn stover, or its lignin fraction, to produce process energy, reducing the need for consumption of fossil energy sources such as natural gas. Moreover, process utility integration between the grain- and stover-based ethanol plants is a possibility that could also reduce energy consumption and subsequent GHG emissions.”).

2. Biofuel Co-Products

a. Distillers' Grains

Modern ethanol plants produce more valuable co-products than in the past, reducing the carbon emissions of their market substitutes. Distillers' grains are an important economic component of ethanol production at dry mills,¹³⁶ providing on average 10% to 20% of total plant revenues.¹³⁷ Dry milling generates on average 15 pounds per bushel of fiber-rich distillers' dried grains with solubles (DDGS), which can be used as a higher quality feedstock to substitute for soy, primarily in ruminant diets. This substitution or "displacement" results in a carbon credit, lowering the lifecycle emissions of corn ethanol.¹³⁸

Many studies in the past erroneously assumed that DDGS are nutritionally equivalent to corn,¹³⁹ allegedly because a bushel of corn used for dry mill ethanol production yields DDGS equal to about a third of the corn's original weight.¹⁴⁰ EPA did not commit this basic error; based on a 2008 Argonne study, the Agency estimated a "maximum" substitution rate of 1.196 pounds of corn.¹⁴¹ But this figure

¹³⁶ NAS Report *supra* note 49, at 30, 136–37.

¹³⁷ Salil Arora et al., *Estimated Displaced Products and Rations of Distillers' Co-Products from Corn Ethanol Plants and the Implications of Lifecycle Analysis* 1 Biofuels 911, 912 (2012), available at <http://1.usa.gov/1UUjGSZ>.

¹³⁸ In 2012, for example, Argonne estimated a distillers' grains credit of 14 CO₂e/MJ for corn ethanol. Wang et al., *supra* note 120, at 9.

¹³⁹ Rita Mumm et al., *Land Usage Attributable to Ethanol Production in the United States: Sensitivity to Technological Advances in Corn Grain Yield, Ethanol Conversion, and Co-Product Utilization*, Biotech. for Biofuels 7, 14 (2014) ("Thus, it is assumed that DDGS included in diets fed to beef cattle replaces corn at a 1:1 rate, although it is acknowledged that substitution rates of 1.1:1 or 1.2:1 have been proposed.").

¹⁴⁰ NAS Report *supra* note 49, at 30.

¹⁴¹ 2010 RFS Rule, 75 Fed. Reg. at 14,836 ("For the proposal, we assumed that one pound of DGS replaced one pound of total of corn and soybean meal for all fed animals. We received numerous comments on this assumption. Many commenters suggested that we adopt the replacement

is too low given new evidence.¹⁴² A recent USDA study predicts that 1 pound of DDGS substitutes for approximately 1.22 pounds of corn when used to feed beef cattle—more than EPA and Argonne predicted in the past.¹⁴³

b. Corn Oil

More recently, Argonne scientists have updated the GREET carbon intensity calculation for corn ethanol to reflect the emergence of corn oil as a significant co-product of ethanol. Over 80% of the dry mill ethanol plants now generate corn oil for biodiesel plants.¹⁴⁴ A bushel of corn currently produces about 0.53lb of corn oil or more.¹⁴⁵ And while corn oil production results in negligible decreases in DDGS, corn

rates included in the recent research by Argonne National Laboratory (ANL) and others. The ANL study found that one pound of DGS can be used to replace 1.196 pounds total of corn and soybean meal for various fed animals due to the higher nutritional content of DGS per pound compared to corn and soybean meal. For the final rulemaking analysis, these replacement rates are incorporated in both the FASOM and FAPRI-CARD models, and are treated as a maximum replacement rate possibility that is fully phased in by 2015.” (footnote call omitted)).

¹⁴² Argonne recently investigated whether new corn oil extraction rates from DDGS could reduce its performance as animal feed, reducing its replacement value. Argonne concluded that there was not enough evidence to “adjust DGS conventional feed displacement ratios in GREET.” Wang et al., *supra* note 134, at 4.

¹⁴³ Linwood Hoffman & Allen Baker, USDA Econ. Res. Serv., *Estimating the Substitution of Distillers’ Grains for Corn and Soybean Meal in U.S. Feed Complex*, FDS-11-I-01, at 30 (2011); see also Salil Arora et al., *Estimated Displaced Products and Ratios of Distillers’ CoProducts from Corn Ethanol Plants and the Implications of Lifecycle Analysis*, 1 *Biofuels* 911 (2010). It should also be noted that some lifecycle analyses have failed to credit the nutritional value of excess stover used for feed. But stover for feed is quite common in certain areas of the Corn Belt. See Steffen Mueller, *Handling of Co-Products in Life Cycle Analysis in an Evolving Co-Product Market: A Case Study with Corn Stover Removal*, 3 *Advances in Appl. Agr. Sci.* 8 (2015).

¹⁴⁴ See Zhichao Wang et al., Argonne Nat’l Lab., *Updates to Corn Ethanol Pathway and Development of an Integrated Corn and Corn Stover Ethanol Pathway on the GREET Model*, ARGONNE/ESD-14/11 (2014).

¹⁴⁵ *Id.* at 3. More recent data suggests that biorefineries in 2012 produced 0.55 lbs of soy oil per bushel of corn. See Scott Irwin, *The Profitability of Ethanol Production in 2015* 6 *Farmdoc Daily*, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, (Jan. 6, 2016), available at <http://bit.ly/1phwLdh>.

oil displaces soy oil used as a feedstock for biodiesel, reducing net GHG emissions.¹⁴⁶ GREET has been updated to include a one-to-one displacement credit to account for the displacement of soy oil.¹⁴⁷ EPA has not updated its 2010 Lifecycle Analysis to reflect this change.

D. Gasoline Production

Since EPA published its lifecycle estimates in 2010, petroleum-based fuels have become more carbon-intensive. As a result, the baseline gasoline carbon intensity value that EPA relied upon in the 2010 RFS Rule is inaccurate.

Gasoline GHG emissions are trending upwards because of increased “use of oil sands and other nonconventional sources of petroleum.”¹⁴⁸ As the NAS Report noted in 2011, a proper “comparison scenario” for ethanol should include marginal GHG emissions “resulting from any change in the use of oil sands and other nonconventional sources of petroleum.”¹⁴⁹ But unlike renewable fuels, gasoline producers are not held to account for their increased GHG emissions.¹⁵⁰

¹⁴⁶ Wang, *supra* note 144, at 4.

¹⁴⁷ *Id.* at 5.

¹⁴⁸ Susan Boland & Stefan Unnasch, Life Cycle Associates, Carbon Intensity of Marginal Petroleum and Corn Ethanol Fuels, LCA.6075.83.2014 (2014); Jeremy Martin, Union of Concerned Scientists, Fueling a Clean Transportation Future, at 1 (2016)(“As oil companies increasingly go after unconventional, hard-to-reach sources such as tar sands and use more intense extraction techniques such as hydraulic fracturing (fracking), dirtier sources of oil have become an increasingly large part of the mix, and wasteful practices are needlessly increasing emissions.”). Oil is the largest fossil fuel contributor to global warming in the United States, contributing more than coal and natural gas.*Id.* at 8.

¹⁴⁹ NAS Report, *supra* note 49, at 195.

¹⁵⁰ See Martin, *supra* note 148, at 5 (“[E]lectricity and biofuels are getting cleaner because producers are subject to careful scrutiny of the global warming emissions associated with the fuels’ production, and public policy is holding producers accountable to reduce these emissions. However, the same level of scrutiny is not being applied to the different sources and methods of producing gasoline. In addition, oil companies are not obligated to reduce emissions from their supply chains. For the United States to avoid the worst consequences of climate change, all fuel producers have to

Methane flares from shale oil extraction dramatically increase GHG emissions.¹⁵¹ And tar sand recovery often requires carbon-intensive steam injection, additional carbon-intensive processing to separate bitumen from tar sands, and chemicals to reduce the viscosity of the product for transportation, increasing extraction emissions.¹⁵² Emissions associated with refining a barrel of tar sand oil are also higher.¹⁵³ And even conventional oil is becoming more carbon-intensive. Oil producers are injecting steam, chemicals, and gases (including methane) to enhance oil recovery, increasing the energy and carbon intensity of conventional oil extraction.¹⁵⁴

EPA's 2010 Lifecycle Analysis significantly understates the carbon intensity of gasoline.¹⁵⁵ When EPA's skewed carbon intensity baseline for gasoline is corrected, corn ethanol is an even more attractive substitute. Because of tight oil, the carbon intensity of gasoline is no longer 93.01g, but 96.89g CO₂e/MJ.¹⁵⁶ Because

minimize their global warming pollution."'). While regulation might help mitigate GHG emissions from tight oil, "[t]he most obvious way for the United States to reduce the problems caused by oil use is to steadily reduce oil consumption through improved efficiency and by shifting to cleaner fuels." *Id.* at 7, 12.

¹⁵¹ *Id.* at 16–17.

¹⁵² *Id.* at 19–20.

¹⁵³ *Id.* at 20.

¹⁵⁴ *Id.* at 15.

¹⁵⁵ Boland & Unnasch, *supra* note 55, at v. Argonne in particular has undertaken major studies of Canadian oil sands, demonstrating that Canadian oil sand products are much more GHG-intensive than previously thought. Hao Cai et al., *Well-to-Wheels Greenhouse Gas Emissions of Canadian Oil Sands Products: Implications for U.S. Petroleum Fuels* 49 *Environ. Sci. Technol.* 8219 (2015); Jacob G. Englander, *Oil Sands Energy Intensity Assessment Using Facility-Level Data*, 29 *Energy Fuels* 5204 (2015). See also Adam R. Brandt, Argonne Nat'l Lab., *Energy Intensity and Greenhouse Gas Emissions from Crude Oil Production in the Bakken Formation: Input Data and Analysis Methods* (September 2015).

¹⁵⁶ *Id.*

tight oil's share of the gasoline market is likely to increase in the future, the carbon impact of petroleum-based fuels is likely to increase as well.

This comparison tilts even further in ethanol's favor because aromatic hydrocarbons (for which ethanol substitutes in gasoline blends) are among the most energy-intensive (and thus carbon-intensive) products of the refining process.¹⁵⁷

E. Tailpipe Emissions

1. Black Carbon

While EPA focused heavily on GHG emissions, it failed to consider the climate-forcing effects of black carbon, or “elemental carbon,”¹⁵⁸ more commonly known as “soot,” which is a form of particulate matter commonly emitted from light-duty vehicle tailpipes.¹⁵⁹ This lapse is significant; the climate forcing effects of black carbon are estimated to be second only to the effects of CO₂ as an agent of climate change.¹⁶⁰

¹⁵⁷ Because ethanol has a high octane number, it allows refineries to displace carbon-intensive reformat aromatics from the blendstock, reducing GHG emissions. See Vincent Kwasniewski et al., *Petroleum Refinery Greenhouse Gas Emission Variations Related to Higher Ethanol Blends At Different Gasoline Octane Rating And Pool Volume Levels*, 10 *Biofuels*, Bioprod. Bioref. 36, 44 (2016), available at <http://bit.ly/1RB2gp1>.

¹⁵⁸ The term is interchangeably used with the term elemental carbon, or EC. The terms refer to different measurement methods that capture roughly the same substance. See Final Revisions to the National Ambient Air Quality Standards for Particulate Matter, Regulatory Impact Analysis, at 639 (2012) [hereinafter PM RIA] (“BC and elemental carbon (EC)(or particulate elemental carbon (PEC)) are used interchangeably in this report because EPA traditionally estimates EC emissions rather than BC and for the purpose of this analysis these measures are essentially equivalent.”), available at <http://1.usa.gov/24S42Mf>; see also Gwami Shrestha et al., *Black Carbon's Properties and Role in the Environment: A Comprehensive Review*, 2 *Sustainability* 294, 307 (2010), available at <http://bit.ly/1p9vrZf>.

¹⁵⁹ See Gwami Shrestha et al., *Black Carbon's Properties and Role in the Environment: A Comprehensive Review*, 2 *Sustainability* 294, 307 (2010), available at <http://bit.ly/1p9vrZf>.

¹⁶⁰ V. Ramanathan, *Indian Ocean Experiment: An Integrated Analysis of the Climate Forcing and Effects of the Great Indo-Asian Haze*, 106 *J. Geophys. Res.* 28,371 (2001), available at

The very same year that EPA published its 2010 Lifecycle Analysis, EPA acknowledged black carbon's role as a climate-forcing agent.¹⁶¹ The scientific literature has linked black carbon to "increased temperatures, accelerated ice and snow melt, and disruptions on precipitation patterns."¹⁶² Black carbon's "climate forcing" potential rests on its capacity to absorb sunlight and darken snow and ice covers, decreasing reflectivity.

Vehicle and fuel emissions studies have repeatedly linked particulate matter emissions, and black carbon in particular, with the use of aromatic additives used to raise octane.¹⁶³ In fact, some studies trace substantially all black carbon emissions from light-duty gasoline vehicles to incomplete combustion of aromatic hydrocarbons.¹⁶⁴

Mobile sources are responsible for a majority of black carbon emissions.¹⁶⁵ Gasoline-powered vehicles in particular are major contributors to black carbon

<http://1.usa.gov/1QFheN8>; Chul E. Chung et al., *Global Anthropogenic Aerosol Direct Forcing Derived from Satellite and Ground-Based Observations*, 110 J. Geophys. Res. D24207 (2005), available at <http://bit.ly/1M85YVv>.

¹⁶¹ EPA, Report to Congress on Black Carbon: Department of the Interior, Environment, and Related Agencies Appropriations Act, 2010, at 11 (2012) [hereinafter Black Carbon Report], available at <http://1.usa.gov/1Uuk9EB>.

¹⁶² *Id.*

¹⁶³ James E. Anderson et al., *Issues with T50 and T90 as Match Criteria for Ethanol Gasoline Blends*, 7 SAE Int. J. Fuels Lubr. 1027, 1031 (2014) ("As discussed in several papers, high-boiling point gasoline hydrocarbons with low vapor pressure and high-double-bond equivalent (DBE) value, primarily aromatics, hydrocarbons, have been identified as the predominant contributors to PM emissions"); Koichiro Aikawa et al., *Development of a Predictive Model for Gasoline Vehicle Particulate Matter Emissions*, 3 SAE Int. J. Fuels Lubr. 610 (2010).

¹⁶⁴ See J.R. Odum et al., *The Atmospheric Aerosol-Forming Potential of Whole Gasoline Vapor*, 276 Science 96, 96 (1997). Because aromatics are "high-distillate," they do not burn during combustion, and they are emitted from the tailpipe as part of vehicle exhaust. See Aikawa et al., *supra* note 163, at 611.

¹⁶⁵ Black Carbon Report, *supra* note 161, at 88.

pollution. According to a recent CARB study, elemental carbon accounts for approximately 70% of all PM mass emissions from gasoline-powered light duty vehicles.¹⁶⁶ Moreover, recent evidence shows that emissions of black carbon from light duty gasoline-powered vehicles are likely an order of magnitude greater than previously estimated.¹⁶⁷ Somewhat counterintuitively, new technologies, like gasoline direct injection (GDI) engines, have increased black carbon emissions from gasoline-powered vehicles.¹⁶⁸

As a substitute for gasoline aromatics, ethanol reduces particulate emissions in general, and black carbon in particular, reducing the risk of global warming.¹⁶⁹ Significantly greater black carbon reductions would be possible with higher levels of ethanol.¹⁷⁰

2. Further GHG Reductions from Mid-level Ethanol Blends

Tailpipe CO₂ emissions following fuel combustion are the largest source of GHG emissions in the lifecycle of most fuel sources, accounting for 72g CO₂e/MJ in

¹⁶⁶ California Air Resources Board, LEV III PM Technical Support Document: Development of Particulate Matter Mass Standards for Future Light-Duty Vehicles 123 (Dec. 7, 2011).

¹⁶⁷ John Liggio et al., *Are Emissions of Black Carbon from Gasoline Vehicles Underestimated? Insights from Near and On-Road Measurements*, 46 Env'tl. Sci. & Tech. 4819 (2012).

¹⁶⁸ Robert A. Stein et al., *Ethanol Blends' Impacts on SI Engine Performance, Fuel Efficiency, and Emissions*, SAE Int. J. Engines 470 (2013); John Liggio et al., *Are Emissions of Black Carbon from Gasoline Vehicles Underestimated? Insights from Near and On-Road Measurements*, 46 Env'tl. Sci. & Tech. 4819 (2012).

¹⁶⁹ See Hao Cai & Michael Wang, DOE Argonne Nat'l Lab., Estimation of Emission Factors of Particulate Black Carbon and Organic Carbon from Stationary, Mobile, and Nonpoint Sources in the United States for Incorporation into GREET, ANL/ESD-14/6, at 23 (2014) ("Gasoline with ethanol blending reduces BC emissions compared with gasoline"), available at <http://1.usa.gov/1QHUCgi>.

¹⁷⁰ See M. Matti Maricq et al., *The Impact of Ethanol Fuel Blends on PM Emissions from a Light-Duty GDI Vehicle*, 46 Aerosol Sci. & Tech. 576, 581 (2011) (Black carbon "decreases slightly from 0% to 17% ethanol, but falls by ~45% for E32 and E45.").

E10 vehicles, out of 86g CO₂e/MJ.¹⁷¹ While ethanol has a lower energy content per gallon than gasoline, ethanol also has a lower carbon content per unit of energy than gasoline. Thus, on a grams-per-mile basis, the tailpipe GHG emissions of ethanol are lower than gasoline's.¹⁷²

And ethanol has the potential to achieve even greater tailpipe GHG reductions, because higher concentrations of ethanol, in the form of mid-level ethanol blends, would enable more efficient engines. Many studies have shown that ethanol's high octane rating (the knock-resistant quality of fuel) can be harnessed to increase vehicle fuel economy, reducing both lifecycle emissions¹⁷³ and tailpipe GHG emissions on a grams-per-mile basis.¹⁷⁴

¹⁷¹ See, e.g., Hao Cai et al., Regional Differences in Life -Cycle Greenhouse Gas and Criteria Pollutant Emissions of Light-Duty Vehicles in the United States, at 11, available at <http://1.usa.gov/1pyymeL>.

¹⁷² See Stein et al., *supra* note 168, at 9 ("CO₂ emissions per unit of heating value [energy content] . . . are about 3% lower for ethanol than for gasoline. The cumulative effect of improved efficiency and lower H/C ratio is an improvement in CO₂ emissions of about 6–9% for ethanol compared to gasoline at equal [brake mean effective pressure (BMEP)] and engine speed at [minimum spark advance for the best torque (MBT)]. For ethanol-gasoline blends, it is expected that this benefit in CO₂ emissions will scale approximately linearly with the molar fraction of ethanol in the blend."); Hosuk H. Jung et al., *Effect of Ethanol on Part Load Thermal Efficiency and CO₂ Emissions of SI Engines*, 6 SAE Int. J. Engines (2013).

¹⁷³ Transitioning to higher ethanol blends would substantially reduce refinery GHG emissions. See also Kwasniewski et al., *supra* note 157; David Hirshfeld et al., *Refining Economics of U.S. Gasoline: Octane Ratings and Ethanol Content*, 48 Environ. Sci. & Technol. 11064, at S128 (2014).

¹⁷⁴ See, e.g., Jeongwoo Han et al., DOE Argonne Nat'l Lab., Wells -to-Wheels Greenhouse Gas Analysis of High-Octane Fuels with Various Market Shares and Ethanol Blends, ANL/ESD-15/10 (2015); Thomas G. Leone et al., *The Effect of Compression Ratio, Fuel Octane Rating, and Ethanol Content on Spark-Ignition Engine Efficiency*, 49 Environ. Sci. Tech. Lett. 10778 (2015); Thomas G. Leone, *Effects of Fuel Octane Rating and Ethanol Content on Knock, Fuel Economy, and CO₂ for a Turbocharged DI Engine*, 7 SAE J. of Fuels & Lubricants 9 (SAE Technical Paper No. 2014 -01-1228); Derek A. Splitter & James P. Szybist, *Experimental Investigation of Spark-Ignited Combustion with High-Octane Biofuels and EGR. 1. Engine Load Range and Downsize Downsized Opportunity*, 28 Energy & Fuels 1418 (2014); Raymond L. Speth, *Economic and Environmental Benefits of Higher-Octane Gasoline*, 48 Environ. Sci. Technol. 48, 6561 (2014); Eric Chow, *Exploring the Use of a Higher Octane Gasoline for the U.S. Light-Duty Vehicle Fleet*, available at <http://bit.ly/1TtytEL>.

Ethanol's high Research Octane Number would enable vehicle manufacturers to build next-generation engines with higher compression ratios, and therefore increased thermal efficiency. By increasing the current engine compression ratio by two points (from 10:1 to 12:1), vehicle manufacturers could increase vehicle efficiency by 5% to 7%; increasing the compression ratio by three points (from 10:1 to 13:1) could increase vehicle efficiency by 6% to 9%.¹⁷⁵ These efficiency gains can be translated into improved fuel economy through engine downsizing and other proven engineering strategies.¹⁷⁶

A recent study estimates that increasing an engine compression ratio by a single point would require a 2.5 to 6 increase in the research octane number (RON) of the fuel, in order to avoid engine knock.¹⁷⁷ Ethanol—a well-known octane enhancer—is a proven, low-GHG substitute for the aromatic additive components in gasoline.¹⁷⁸ A recent Oak Ridge National Laboratory study of mid-level ethanol found that the use of an E30 blend in optimized spark-ignited engines would result in significant increases in engine efficiency and provide expanded downsizing and downspeeding opportunities, which can translate into significant improvements in vehicle fuel economy.¹⁷⁹

¹⁷⁵ See David Hirshfeld et al., *Refining Economics of U.S. Gasoline: Octane Ratings and Ethanol Content*, 48 Environ. Sci. & Technol. 11064, 11065 (2014).

¹⁷⁶ Jeongwoo Han et al., DOE Argonne Nat'l Lab., Wells-to-Wheels Greenhouse Gas Analysis of High-Octane Fuels with Various Market Shares and Ethanol Blends, ANL/ESD-15/10, at 44 (2015); Derek A. Splitter & James P. Szybist, *Experimental Investigation of Spark-Ignited Combustion with High-Octane Biofuels and EGR. 1. Engine Load Range and Downsize Downspeed Opportunity*, 28 Energy & Fuels 1418 (2014).

¹⁷⁷ Hirshfeld, *supra* note 175, at 11065; Raymond L. Speth et al., *Economic and Environmental Benefits of Higher-Octane Gasoline*, 48 Environ. Sci. Technol. 48, 6561 (2014).

¹⁷⁸ Splitter & Szybist, *supra* note 176.

¹⁷⁹ *Id.*

Tailpipe GHG reductions from increased compression engines would be significant. A 2014 study conducted by Ford and GM concluded that blending E30 to produce a 101 RON fuel for use in high-compression engines could reduce baseline tailpipe GHG emissions by 7%.¹⁸⁰

Other studies have reached similar conclusions. A 2013 MIT study estimates that engine efficiencies enabled by mid-level ethanol blends could reduce 35 million tons of CO₂ annually, with fuel savings of up to \$6 billion for consumers at the pump.¹⁸¹ Indeed, recent estimates show that splash-blending an additional 20% of ethanol into an E10 fuel to create a 93 AKI fuel (equivalent to today's premium blend of gasoline) would cost 9 cents a gallon *less* than regular gasoline using 2014 prices.¹⁸²

Finally, an Argonne lifecycle study simulating several market-penetration scenarios for mid-level ethanol blends found that the change in lifecycle GHG emissions “was dominated by the positive impact associated with vehicle efficiency gains and ethanol blending levels.”¹⁸³ In particular, the “5% and 10% MPGGE [miles per gallon of gasoline-equivalent] gains” achieved through mid-level ethanol blends reduced lifecycle GHGs “by 4% and 8%, respectively.”¹⁸⁴ A blend of E40 with a 100

¹⁸⁰ Thomas G. Leone et al., *The Effect of Compression Ratio, Fuel Octane Rating, and Ethanol Content on Spark-Ignition Engine Efficiency*, 49 Environ. Sci. Tech. Lett. 10778, 10785 (2015).

¹⁸¹ Speth et al., *supra* note 177. The study modeled the benefits of transitioning from regular octane to current premium fuel octane values (98 RON), with different ethanol volumes (E10, E15, E20). The study concluded that a 98 RON would improve net CO₂ emissions by as much as 35 million tons per year in 2040. *Id.* at 6561. E10 fuels would not be able to achieve such high octane levels without the addition of costly and carbon -intensive aromatic hydrocarbons that harm human health. See Hirshfield, *supra* note 175, at S128.

¹⁸² Thomas Darlington et al., *The Economics of Eco-Performance Fuel*, at 2 (Apr. 22 2014), available at <http://bit.ly/1pzKzU>.

¹⁸³ Jeongwoo Han et al., *supra* note 176, at xii.

¹⁸⁴ *Id.*

RON could reduce GHG lifecycle emissions by 18%, while delivering a 10 mile-per-gallon increase in vehicle fuel economy.¹⁸⁵

The best information available therefore shows that significant additional GHG reductions could be achieved through mid-level blends of ethanol. EPA's 2010 Lifecycle Analysis, however, entirely fails to account for the possibility of a mid-level ethanol future.

* * *

In 2010, EPA predicted that blending corn ethanol into gasoline would significantly reduce GHG emissions. The Agency was right about that, but ethanol is even better at cutting carbon emissions than EPA gave it credit for. In the 2010 RFS Rule, EPA estimated corn ethanol would have a carbon intensity of 74.81g CO₂e/MJ in 2022, relative to the baseline gasoline carbon intensity of 93.01g CO₂e/MJ.¹⁸⁶ A recent conservative estimate would place corn ethanol's carbon intensity at 59.21g CO₂e/MJ and gasoline's carbon intensity at 96.89g CO₂e/MJ—without any credit for soil carbon sequestration.¹⁸⁷ When updated to reflect Argonne's latest estimate for land-use change in a conventional-till scenario, the carbon intensity of corn ethanol falls to 54.81g CO₂e/MJ.¹⁸⁸ And when further updated to reflect recent estimates for soil carbon sequestration, the carbon intensity of corn ethanol falls by an additional 18.19 to 178.47g, to a carbon intensity ranging from 36.62 to *negative* 123.66g CO₂e/MJ.¹⁸⁹ This means that over their respective lifecycles, ethanol results in 60.27% to 227.63% less carbon pollution than gasoline

¹⁸⁵ *Id.* at xiii.

¹⁸⁶ 2010 RFS Rule, 75 Fed. Reg. 14,788. EPA reported the carbon intensity of corn ethanol as 79g CO₂e/mmBTU (equivalent to 74.82g CO₂e/MJ) with a range of 54 to 97g CO₂e/mmBTU (or 51.14 to 91.86g CO₂e/MJ). EPA's baseline gasoline carbon intensity for the year 2005 was 98.205g CO₂e/mmBTU (or 93.01g CO₂e/MJ). 2010 RFS RIA, *supra* note 1, at 467.

¹⁸⁷ Boland & Unnasch, *supra* note 54, at 20.

¹⁸⁸ GREET1_2015 (summarized in Appendix I, *infra* p. 69).

¹⁸⁹ See *supra* p. 25; Appendix II, *infra* p. 73

on an energy-equivalent basis. And that does not account for the fuel efficiency gains that are possible with higher ethanol blends. The GHG benefits of ethanol will only grow as ethanol production becomes increasingly efficient, and gasoline production continues to get dirtier. EPA's current GHG lifecycle analysis is clearly in need of correction.

IV. CONVENTIONAL AIR POLLUTANTS

As with GHG emissions, new evidence shows that corn ethanol produces less air pollution over its lifecycle than previously estimated, significantly outpacing projections of the ethanol industry's efficiency gains. But EPA continues to disseminate its 2010 Lifecycle Analysis and its 2011 Report to Congress, which do not account for the latest innovations in corn ethanol production. Nor does EPA's analysis take into account the growing market share of "tight oil," which increases lifecycle emissions from gasoline. As a result, EPA's lifecycle analyses do not accurately model the conventional air pollution emissions attributable to ethanol and gasoline.

New evidence from fuel emissions studies shows that blending ethanol into gasoline has already significantly reduced tailpipe emissions and that these reductions would be even more pronounced for mid-level ethanol blends. Because EPA has the authority to facilitate the switch to higher ethanol blends, the Agency should consider studies that show additional lifecycle reductions from transitioning to mid-level blends of ethanol.

The EPA's analysis of the RFS's air quality effects is methodologically flawed, incomplete, and out of date. At every stage in the fuel life cycle, corn ethanol is now cleaner, and gasoline dirtier than EPA estimated.

A. Lifecycle Analysis of Conventional Pollutants

Few studies have comprehensively modeled the lifecycle impacts of ethanol and gasoline on non-GHG emissions.¹⁹⁰ While some early studies focused on PM_{2.5} and its precursors,¹⁹¹ EPA's 2010 Lifecycle Analysis emphasized increases in ground-level ozone, or "smog," from increased emissions of nitrogen oxides (NO_x), volatile organic compounds (VOCs),¹⁹² and carbon monoxide (CO) from biofuel production

¹⁹⁰ See *supra* pp. 30–32. For an early but outdated example, see Jason Hill et al., Climate Change and Health Costs of Air Emissions from Biofuels and Gasoline, 106 PNAS 2077 (2009), which EPA cited in the 2011 Report to Congress. See 2011 Report to Congress, *supra* note 7, 3-23

¹⁹¹ PM is a mixture of solid particles and liquid droplets suspended in the atmosphere. PM is classified as either "primary" PM—particulates emitted directly into the atmosphere from a tailpipe or smoke stack—or "secondary" PM, which is formed through complex atmospheric reactions when gases interact with particles. Control of Air Pollution From Motor Vehicles, Tier 3 Rule Motor Vehicle Emission and Fuel Standards, 79 Fed. Reg. 23414, 23429 (Apr. 28, 2014) [hereinafter Tier 3 Rule]. For regulatory purposes, EPA also classifies PM according to particle diameter—fine particles of less than 2.5 micrometers in diameter are classified as PM_{2.5}. PM_{2.5} is more dangerous than PM₁₀, because it penetrates deeper into the lungs, entering into the bloodstream. EPA, Integrated Science Assessment for Particulate Matter 3–6 (2009). PM_{2.5} is associated with a host of negative health effects, including premature death, cardiovascular problems, developmental delay, and carcinogenic, mutagenic, and genotoxic effects, most prominently, lung cancer. Tier 3 Rule, 79 Fed. Reg. at 23430. PM has been designated by the World Health Organization as a Group 1 carcinogen. World Health Organization, 109 IARC Monographs on the Evaluation of Carcinogenic Risks to Humans: Outdoor Air Pollution 443 (2015).

¹⁹² VOCs photochemically react to form ozone, but not all VOCs are created equal when it comes to ozone. The smog-forming potential of VOCs depends on their relative tendency to react with sunlight to create ozone—their ozone-forming potential. See National Academy of Sciences, Ozone-Forming Potential of Reformulated Gasoline 33–72 (1999) (discussing VOCs and the science of ozone reactivity). EPA excludes organic compounds with low photochemical reactivity such as methane from its definition of VOCs. 40 C.F.R. 51.100(s) (defining VOC to mean "any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions."). Immediately following the definition is a list of organic compounds that "have been determined to have negligible photochemical reactivity." *Id.* The two most important organic compounds that are not classified as VOCs are methane and ethane. *Id.*

under the RFS.¹⁹³ EPA estimated between 36 and 160 additional cases of adult mortality from exposure to ozone as a result of the RFS.¹⁹⁴

Following the 2010 Lifecycle Analysis, EPA released its 2011 Report to Congress and EPA scientists led by Rich Cook published their lifecycle analysis of the RFS in a peer-reviewed journal, focusing on “criteria” pollutants and on certain species of “air toxics”—pollutants that cause cancer and other health effects.¹⁹⁵ In its peer-reviewed study, EPA found “little net impact” on the overall cancer risk as a result of the RFS.¹⁹⁶ Ozone concentrations, by contrast, would increase in some (but not all) areas by as much as 1 part per billion—mostly as a result of increased NO_x and VOC emissions from agriculture, biorefineries, and fuel combustion.¹⁹⁷ EPA scientists conceded that significant uncertainty remained in the modeling of ozone emissions, especially given limited data on the tailpipe effects of E10 in modern vehicles.¹⁹⁸

¹⁹³ Ozone is known to cause asthma, pulmonary inflammation, and premature death. Studies have also associated ozone with heart problems and vascular disease. *See* National Ambient Air Quality Standards for Ozone, 80 Fed. Reg. 65292, 65302 (Oct. 26, 2015). It is the product of photochemical reactions of VOCs, NO_x, and CO in the atmosphere. *Id.* at 65299. Ozone formation depends on heat and sunlight; prolonged high temperatures and sunlight with stagnant air can build up ozone in the atmosphere. *Id.* at 65300. The reactions are complex and non-linear. Proposed Revisions to the National Ambient Air Quality Standards for Ground-Level Ozone, Regulatory Impact Analysis, at 2-1 (2015). When VOCs levels are high relative to NO_x, as in rural areas, NO_x tends to increase ozone. By contrast, when VOC levels are low relative to NO_x, as in many urban areas, increases in NO_x may actually decrease ozone. *Id.*

¹⁹⁴ 2010 RFS RIA, *supra* note 1, at 5.

¹⁹⁵ Rich Cook et al., *Air Quality Effects of Increased Use of Ethanol under the United States’ Energy Independence and Security Act*, 45 Atmospheric Environ. 7714, 7714 (2011).

¹⁹⁶ *Id.* at 7723.

¹⁹⁷ Cook predicted that in urban (NO_x saturated) areas with serious ozone problems—for example, southern California—increases in NO_x emissions would reduce ozone by more than 0.05 parts per billion. *Id.* at 7718.

¹⁹⁸ *Id.* at 7723.

Subsequent studies and technological innovations have demonstrated that the 2010 Lifecycle Analysis is not a reliable or useful measure of the current lifecycle emissions of either ethanol or gasoline.

B. Corn Agriculture

Feedstock production is responsible for a substantial portion of the expected air pollution costs of ethanol.¹⁹⁹ Farmers emit PM by using tractors and other diesel equipment, by tilling soils, and by applying fertilizer and pesticides to the soil, which emit PM and PM precursors during the production, transportation, and application process.²⁰⁰ In 2010, corn ethanol fared poorly relative to biofuel alternatives “because it requires, per unit of fuel produced, more fossil fuel and fertilizer inputs that emit large amounts of . . . PM_{2.5}.”²⁰¹ But as a 2009 study noted, the “[e]nvironmental costs per unit of ethanol decline with higher biomass yield, lower fertilizer and fuel inputs into biomass production, and improvements in biomass to biofuel conversion efficiencies.”²⁰²

Just as predicted, the adoption of no-till, reduced-till, and conservation farming has reduced NO_x, PM_{2.5} and PM₁₀ emissions in the Corn Belt, by reducing both dust from the disturbance of soils, and diesel used during tillage. This trend is likely to continue in the future, as farmers realize higher crop yields from no-till and reduced-tillage practices.²⁰³ The use of GPS technology and new harvesting

¹⁹⁹ Jamil M. Kusiima & Susan E. Powers, *Monetary Value of the Environmental Health Externalities Associated with the Production of Ethanol from Biomass Feedstocks* 38 Energy Pol’y 2785, 2791 (2010).

²⁰⁰ 2011 Report to Congress, *supra* note 7, at 3-24.

²⁰¹ Hill et al., *supra* 190, at 2080.

²⁰² *Id.* at 2078.

²⁰³ See Neil C. Hansen et al., *Research Achievements and Adoption of No-Till, Dryland Cropping in the Semi-Arid U.S. Great Plains*, 132 Field Crops Res. 196, 198 (2012). Since 1972, when USDA began

techniques—like single pass-harvesting—have also allowed farmers to reduce diesel consumption and the consequent NO_x and PM_{2.5} emissions.²⁰⁴ Reductions in NO_x from agriculture are expected to continue as the States find ways to comply with EPA’s new ozone standards.²⁰⁵

PM_{2.5} and NO_x lifecycle emissions from corn production have fallen in response to new technologies and improvements in farming. As discussed above, corn yields have increased while nitrogen application rates have remained constant.²⁰⁶ Farmers have invested in controlled-release nitrogen technologies that apply nitrogen efficiently and limit NO_x and NH₃ formation, further reducing the per-gallon PM_{2.5} emissions of ethanol.²⁰⁷

C. Petroleum Extraction

A 2009 study warned that “a shift from crude oil to oil sands . . . would greatly increase emissions, unless accompanied by simultaneous improvements in abatement technology.”²⁰⁸ That warning has proven true, and no abatement panacea has emerged. Since EPA first disseminated its 2010 Lifecycle Analysis, “tight oil” sources have claimed an ever larger share of the market, and dirty sources of crude

keeping statistics, the adoption of no-till has increased on average by 2.3% a year —over the past four decades, no-till farming has grown from 3.3 million acres to more than 96 million acres. See John Dobberstein, *No-Till Movement in U.S Continues to Grow*, No-Till Farmer (Aug. 1, 2014), available at <http://bit.ly/1phxg7b>.

²⁰⁴ See Mueller & Kwik, *supra* note 124, at 19–23; see also USDA, NRCS, Particulate Matter (explaining that precision farming reduces PM emissions), available at <http://1.usa.gov/1TNlsX2>.

²⁰⁵ See Bob Stallman, *Nation’s Farmers to Feel the Impact of EPA’s Proposed Ozone Rule*, The Hill (Jul. 20, 2015).

²⁰⁶ See *supra* p. 28

²⁰⁷ See USDA, Addressing Ozone and Particulate Matter from Agricultural Sources, NRCS, available at <http://1.usa.gov/1RSfO27>.

²⁰⁸ Hill et al., *supra* note 190, at 2078.

like Canadian tar sands and shale oil are expected to become the new normal. Tar sands, a notoriously dirty source of gasoline, accounted “for 9.4% of the total crudes processed in U.S. refineries in 2013,” and that level is “forecast to reach 13.6% in 2020.”²⁰⁹ Shale oil, also dirtier than conventional oil, accounted for 50% of U.S. crude oil production in 2015.²¹⁰

New evidence shows that the shift to tight oil sources has significantly increased gasoline’s lifecycle emissions of PM_{2.5}, VOCs, NO_x, and carcinogenic hydrocarbons like benzene and polycyclic aromatic hydrocarbons (PAHs).

1. Tar Sands Extraction

Canadian tar sands or oil sands are “one of the world’s dirtiest and most environmentally destructive sources of fuel.”²¹¹ Tar sand deposits consist of water, sand, and bitumen, which can be recovered via surface mining or steam injection.²¹² After the bitumen is recovered, it is either upgraded to synthetic crude oil using an energy-intensive combination of heat, water, pressure, and catalysts on site, or diluted for further transportation.²¹³ Because bitumen is a highly dense and viscous substance, toxic chemicals are added to reduce the viscosity of the substance for transportation via pipelines.²¹⁴

²⁰⁹ Cai et al., *supra* note 155; Englander et al., *supra* note 155.

²¹⁰ Marcelo Prince & Carlos A. Tovar, *How Much U.S. Oil and Gas Comes From Fracking?* Wall Street J. (Apr. 1, 2015), <http://on.wsj.com/1G6QAtt>.

²¹¹ NRDC, *Tar Sands Crude Oil: Health Effects of a Dirty and Destructive Fuel*, Issue Brief, at 1 (Feb. 2014), available at <http://on.nrdc.org/1P0Tzm6>.

²¹² Erin N. Kelly et al., *Oil Sands Development Contributes to Polycyclic Aromatic Compounds to the Athabasca River and Its Tributaries*, 106 PNAS 22346, 22346 (2009).

²¹³ Kelly et al., *supra* note 212; Cai et al., *supra* note 155; Martin, *supra* note 148, at 19–20 (discussing how tar sand extraction leaves behind highly polluted water).

²¹⁴ See National Academy of Sciences, *Spills of Diluted Bitumen from Pipelines: A Comparative Study of Environmental Fate, Effects, and Response*, at 24 (2015).

Oil sand production also results in emissions of carcinogenic PAHs and a variety of trace metals.²¹⁵

Unsurprisingly, areas near tar sand extraction sites have a high incidence of cancer.²¹⁶ The overall cancer rate at these locations is much greater than previously estimated, and has been linked to oil sands operations.²¹⁷ The increased cancer risk is likely due to high emissions of PAHs from oil sands production.²¹⁸

²¹⁵ PAHs are complex chemicals built on three to five benzene rings. Kelly et al., *supra* note 212, SI at 1. EPA acknowledges PAHs to be probable human carcinogens. Tier 3 Rule, 79 Fed Reg. at 23436. Indeed, some common PAHs are demonstrated carcinogens—benzo[a]pyrene (BaP), a common PAH found in petroleum-based gasoline, is a Group 1 carcinogen. *See* Benzo[a]pyrene, IARC Monograph, at 138, available at <http://bit.ly/1QIIhZd>. *See also* Takeshi Ohura et al., *Polycyclic Aromatic Hydrocarbons in Indoor and Outdoor Environments and Factors Affecting their Concentrations*, 38 Environ. Sci. & Tech. 77 (2004). Naphthalene, another PAH found in gasoline, is believed to cause cancer and other toxic health effects. Tier 3 Rule, 79 Fed Reg. at 23436. According to California's Office of Environmental Health Hazard Assessment (OEHHA), the “unit cancer risk” for PAHs—the risk that a certain dose will cause cancer over an individual’s lifetime, Final New Source Performance Standards and Amendments to the National Emissions Standards for Hazardous Air Pollutants for the Oil and Natural Gas Industry, Regulatory Impact Analysis, at 4 -12 & n.36 (2012)—is approximately 407 times greater than the corresponding unit risk for acetaldehyde, 38 times greater than the unit risk for benzene, and about 184 times greater than the unit risk for formaldehyde. Stefan Unnasch & Ashley Henderson, Life Cycle Associates, Change in Air Quality Impacts Associated with the use of E15 Blends Instead of E10, LCA.6091.94.2014, at 11 (2014). In addition to being highly carcinogenic and mutagenic, PAHs have been linked to a host of negative health effects, including adverse birth outcomes, development delays, anxiety, depression, and attention deficit disorder, particularly in urban children exposed to high-levels of coal and vehicle exhaust. Tier 3 Rule, 79 Fed Reg. at 23436; Frederica P. Perera et al., *Prenatal Polycyclic Aromatic Hydrocarbon (PAH) Exposure and Child Behavior at age 6-7*, 120 Environ. Health Persp. 921 (2012).

²¹⁶ Isobel J. Simpson et al., *Air Quality in the Industrial Heartland of Alberta, Canada and Potential Impacts on Human Health*, 81 Atmosph. Environ. 72 (2013).

²¹⁷ Yiqun Chen, Alberta Health Services, Cancer Incidence in Fort Chipewyan, Alberta 1995–2006 (2009); *see also* Marty Klinkenberg, *Oil Sands Pollution Linked to Higher Cancer Rates in Fort Chipewyan for First Time: Study*, Financial Post (July 8, 2014).

²¹⁸ Abha Parajulee & Fran Wania, *Evaluating Officially Reported Polycyclic Aromatic Hydrocarbon Emissions in the Athabasca Oil Sands Region with a Multimedia Fate Model*, 111 PNAS 3344 (2014); Kelly et al., *supra* note 212, at 22350 (“Due to substantial loadings of airborne PAC [polycyclic aromatic compounds], the oil sands industry is a far greater source of regional PAC contamination than previously realized”); *id.* at Supplemental Information 1.

Diluted bitumen (“dilbit”) and synthetic crude transportation to U.S. refineries also pose lifecycle risks to human health within the United States. Dilbit exports have doubled since 2008, up to 550,000 barrels per day, representing more than half of all tar sand oil imports into the United States.²¹⁹ Dilbit spills impose particularly heavy costs on society—a recent dilbit spill in Michigan has cleanup costs exceeding \$1 billion,²²⁰ and has imposed significant health costs on society by releasing benzene and PAHs into the water and the ambient air.²²¹

2. Shale Oil Extraction

Shale oil extraction is a source of many air pollutants that affect human health in the United States; in addition to benzene and other known toxics, the production of shale oil and gas involves heavy diesel vehicles and equipment that emit substantial ambient PM_{2.5}.²²² Because on average, a fracking well requires “between 2 and 5 million gallons of water per hydraulic fracturing event . . . it has been estimated that approximately 2,300 trips by heavy-duty trucks are required for each horizontal well[.]”²²³ Moreover, because shale wells are concentrated in particular

²¹⁹ See National Research Council, National Academy of Sciences, *Spills of Diluted Bitumen from Pipelines: A Comparative Study of Environmental Fate, Effects, and Response* 9 (2015); Anthony Swift et al., NRDC, NWF, PST, Sierra Club, *Tar Sands Pipelines Safety Risks* 5 (Feb. 2011).

²²⁰ National Research Council, National Academy of Sciences, *Spills of Diluted Bitumen from Pipelines: A Comparative Study of Environmental Fate, Effects, and Response* 38 (2015).

²²¹ Michigan Department of Community Health, Public Health Assessment of Kalamazoo River/Enbridge Spill, Final Report (2013), *available at* <http://1.usa.gov/1phxtXZ>.

²²² See, e.g., Seth B. Shonkoff et al., *Environmental Public Health Dimensions of Shale and Tight Gas Development*, 122 *Environ. Health Persp.* 787 (2014); Anirban Roy, *Air Pollutant Emissions from the Development, Production, and Processing of Marcellus Shale Natural Gas* 64 *J. Air & Waste Mgmt. Ass’n* 19 (2014).

²²³ Shonkoff et al., *supra* note 222, at 791.

“hot spots,” concentrated diesel PM_{2.5} and benzene have increased the incidence of cancer and respiratory disease in those areas.²²⁴

Shale oil extraction also emits significant amounts of PM_{2.5} precursors and VOCs, which have worsened smog problems in Colorado and Utah.²²⁵ Moreover, air measurement studies show that current emission inventories underestimate the emissions of benzene and VOCs from shale.²²⁶ A recent study by the National Oceanic and Atmospheric Administration (NOAA) concludes that VOC emissions are underestimated by a factor of at least two and that benzene emissions are seven-fold higher than reported in Colorado’s inventory.²²⁷

Furthermore, as the *amount* of pollution from petroleum extraction is increasing, the *domestic share* of that pollution is increasing as well. Unlike conventional oil, which is largely produced in foreign countries, tight oil production occurs in the United States.²²⁸ Conventional air pollutants are location-specific (unlike GHGs), so increased U.S. production of new petroleum sources has a profound adverse effect on domestic air quality.

²²⁴ *Id.* A NIOSH field investigation is currently investigating the risk posed by PM emissions of diesel exhaust to oil and gas workers and their families. See NIOSH, Field Effort to Assess Chemical Exposure Risk, Fact Sheet, *available at* <http://1.usa.gov/1UUkszm>; see also NIOSH, Oil & Gas Extraction, OSHA, *available at* <http://1.usa.gov/1LS2oUv>.

²²⁵ See Proposed Emission Standards for New and Modified Sources in the Oil and Natural Gas Sector, Regulatory Impact Analysis, at 4-19 (2015).

²²⁶ Gabrielle Pétron et al., *A New Look at Methane and Non-Methane Hydrocarbon Emissions from Oil and Natural Gas Operations in the Colorado Denver-Julesburg Basin*, 119 J. Geophys. Res. Atmospheres 6836 (2014) [hereinafter Pétron et al., *Hydrocarbon Emissions from Oil and Natural Gas*]; Gabrielle Pétron et al., *Hydrocarbon Emissions Characterization in the Colorado Front Range: A Pilot Study*, 117 J. Geophys. Res. 236 (2012).

²²⁷ Pétron et al., *Hydrocarbon Emissions from Oil and Natural Gas*, *supra* note 226.

²²⁸ See U.S. Energy Information Administration, Annual Energy Outlook, at D-14 to D-15 (2015) (predicting increased United States production of oil between 2013 and 2020).

EPA's 2010 Lifecycle Analysis does not account for the growing market share of "tight oil." EPA's analysis therefore excludes the higher emissions of PM_{2.5}, NO_x, SO_x, and other pollutants from oil sands and from shale oil production—a significant omission given that tar sands account for 10% of all crude processed by U.S. refineries (and are forecast to reach 13.6% by 2020),²²⁹ and shale oil accounts for 50% of total United States oil production.²³⁰

D. Fuel Production

1. Ethanol Biorefineries

Corn ethanol biorefineries are a source of PM_{2.5}, both because they directly emit PM precursors, including volatile organic compounds VOCs, SO₂ and NO_x, and because they consume significant amounts of natural gas.²³¹

But, as with farming, the lifecycle PM emissions of corn ethanol production are falling: increased ethanol yields, new and higher co-product yields, and the use of combined heat and power and other improvements in biorefinery energy efficiency have reduced natural gas usage in ethanol plants, reducing emissions of PM_{2.5} and its precursors.²³²

Biorefineries also emit VOCs through a variety of processes, mostly through evaporative emissions of ethanol and acetaldehyde from boilers.²³³ While these

²²⁹ Cai et al., *supra* note 146.

²³⁰ Marcelo Prince & Carlos A. Tovar, How Much U.S. Oil and Gas Comes From Fracking? Wall Street J. (Apr. 1, 2015), *available at* <http://on.wsj.com/1RSfTTn>.

²³¹ Joost De Gouw et al., *Airborne Measurements of the Atmospheric Emissions from a Fuel Ethanol Refinery*, 120 J. Geo. Res: Atmosph. 4385, 4338 (2015).

²³² See Mueller & Kwik, *supra* note 124, at 2-18; 2011 Report to Congress, *supra* note 7, at 4-5.

²³³ See Prevention of Significant Deterioration, Nonattainment New Source Review, and Title V: Treatment of Certain Ethanol Production Facilities Under the "Major Emitting Facility"

chemicals contribute to ozone, they are relatively non-toxic compared to the toxic hydrocarbons emitted during the lifecycle of gasoline.²³⁴ Existing pollution control technologies are being implemented at a low cost to substantially reduce these biorefinery emissions.²³⁵ It is therefore critical that lifecycle emissions estimates be based on representative technology.²³⁶

Any analysis of biorefinery emissions must take into account the relatively low toxicity of ethanol and acetaldehyde emissions, compared with the VOCs emitted from gasoline refineries. And such an analysis must also consider the proximity of these facilities to humans. Because ethanol refineries are mostly co-located with corn fields in rural areas, they have lower impacts on human health per unit of pollution than gasoline refining, which occurs largely near urban areas.²³⁷

2. Petroleum Refineries

Petroleum refineries are a significant source of urban pollution, including PM_{2.5} and other air toxics like benzene. Unlike biorefineries, crude oil refineries are

Definition, 72 Fed. Reg. 24060, 24070 (May 1, 2007); *see also* Cook et al., *supra* note 195, at 7715 (“VOCs emitted in the largest quantity from ethanol plants include formaldehyde and acetaldehyde”).

²³⁴ Unlike ethanol and acetaldehyde, which typically cause eye irritation, refineries emit substantial amounts of benzene, a known carcinogen. *See* Final New Source Performance Standards and Amendments to the National Emissions Standards for Hazardous Air Pollutants for the Oil and Natural Gas Industry, at 4-14 (Apr. 2012).

²³⁵ Dan Despen, *Accurate VOC, HAP Measurement Critical for Permit Compliance*, Ethanol Producer Magazine (Oct. 15, 2014), *available at* <http://bit.ly/1p9tr3g>.

²³⁶ Studies of outdated technology will report outdated results. For example, NOAA air measurements of an ethanol plant suggested that VOC emissions from ethanol plants might be greater than EPA estimates. In particular, NOAA’s air measurements suggested that refinery emissions of ethanol and acetaldehyde are underestimated by current inventories. De Gouw et al., *supra* note 231. But NOAA scientists took their air measurements from a single unrepresentative plant in Decatur, Illinois—one of the few remaining coal-powered wet-mill ethanol refineries left in the country. *Id.* at 4390. Further studies are needed to determine the accuracy of current inventories.

²³⁷ *See infra* note 238.

located near urban populations.²³⁸ According to EPA, more than 6.1 million people live within three miles of a petroleum refinery—disproportionately low-income minorities and vulnerable community groups.²³⁹ In addition to being subjected to dangerous amounts of benzene and PAHs, petroleum processing and fossil fuel combustion from refineries subject these residents to significant quantities of PM_{2.5} and PM_{2.5} precursors like SO₂—up to 247,000 tons of SO₂ and 30,000 tons of direct PM_{2.5} per year.²⁴⁰ Refinery emissions of xylene and other hydrocarbons also contribute to ozone.²⁴¹

Refineries pollute more today than in the past because of the source of the petroleum. Tar sands products increase refinery emissions: dilbit and synthetic crude contain higher amounts of benzene and heavy metals, which evaporate during the

²³⁸ See Hill et al., *supra* note 190, at 2078; Christopher W. Tessum et al., *A Spatially and Temporally Explicit Life Cycle Inventory of Air Pollutants from Gasoline and Ethanol in the United States* 46 Environ. Sci. & Tech. 11408, at Supplemental Information 2-1 (2012) (finding that 80% of refineries are near population centers, compared to only 10% of biorefineries). The Tessum study omits Canadian refinery emissions, which contribute to cross-border pollution in the United States. See, e.g., Canada-United States Air Quality Agreement Progress Report (2012) (stating that the petroleum industry accounts for 21% of all Canadian NO_x), available at <http://bit.ly/1M83Ywe>; see also Natural Resources Canada, Canadian Refineries Government of Canada (location of Canadian refineries), at <http://bit.ly/1RSdBU5>.

²³⁹ EPA, Final Petroleum Refinery Sector Risk and Technology Review and New Source Performance Overview, Fact Sheet, available at <http://1.usa.gov/1R8suPi>.

²⁴⁰ See EPA, Addressing Air Emissions from the Petroleum Refinery Sector, Public Outreach Presentation, Office of Air Quality Planning and Standards 3 (2011), available at <http://1.usa.gov/1RB11WX>. These numbers remain high despite the fact that gasoline refineries have been subjected to EPA and state enforcement for decades. See James H. Wilson Jr. & Maureen A. Mullen, Including the Emission Effects of Refinery Cases and Settlements in Projections for the EPA's CAAA Section 812 Analysis (2015), available at <http://1.usa.gov/1TNjExm>.

²⁴¹ See William P.L. Carter, Updated Maximum Incremental Reactivity Scale and Hydrocarbon Bin Reactivities for Regulatory Applications (Jun. 22, 2009), available at <http://bit.ly/1U4vNxq>.

refining process. They are also harder to break down into light gasoline products, increasing VOC emissions and ozone.²⁴²

E. Tailpipe Emissions

Unlike upstream air toxic emissions from producing ethanol, which affect air quality of areas primarily in the rural Midwest, tailpipe emissions are ubiquitous and disproportionately affect densely populated urban areas. Mobile sources are responsible for approximately “47 percent of outdoor toxic emissions, over 50 percent of the cancer risk, and over 80 percent of the noncancer hazard.”²⁴³

Blending ethanol into gasoline reduces air pollution from motor vehicles, improving the lifecycle health effects of ethanol. But EPA relied on outdated, flawed studies to support contrary conclusions in its 2010 Lifecycle Analysis and 2011 Report to Congress. By underestimating the tailpipe benefits of existing ethanol blends, EPA systematically underestimated the air quality benefits of corn ethanol. Moreover, by ignoring future mid-level ethanol blends, EPA ignored the lifecycle benefits that can be achieved in a high-ethanol, high-octane future.

In its 2010 Lifecycle Analysis, EPA correctly stated that for E10 “most studies show reductions in emissions of . . . benzene, and 1,3-butadiene[.]”²⁴⁴ However, according to EPA, “data . . . are more equivocal for NO_x and VOC.”²⁴⁵ Based on

²⁴² NRDC, Tar Sands Crude Oil: Health Effects of a Dirty and Destructive Fuel 5 (Feb. 2014), *available at* <http://on.nrdc.org/1A6w1Y1>.

²⁴³ 2010 RFS RIA, *supra* note 1, at 604.

²⁴⁴ Cook et al., *supra* note 195, at 7715.

²⁴⁵ *Id.*

“limited data,” EPA assumed that E10 decreased VOC emission rates by 7% to 10%, but increased NO_x by over 7%.²⁴⁶ In fact, E10 reduces NO_x.

To reach its unsupported conclusion with respect to NO_x, EPA’s 2010 Lifecycle Analysis extended the results of the “so-called ‘Predictive Model,’” developed more than 16 years ago to assess California’s request for an oxygenate waiver in Tier 0 vehicles, and used test data from trade groups including Exxon Mobil and the Mexican Petroleum Institute.²⁴⁷ Even though the Agency admitted that “there was not enough consistency across these studies to confidently predict the impact of oxygenated fuel on . . . NO_x emissions,”²⁴⁸ EPA irrationally extended its NO_x results to Tier 1 vehicles, based on a single flawed study published by the Coordinating Research Council, which was designed to model the effect of oxygen and RVP on carbon monoxide, not NO_x.²⁴⁹ Moreover, EPA found that the data did not justify extending the results to Tier 2 vehicles.²⁵⁰ Subsequent, peer reviewed studies by EPA, however, state without qualification that “E10 was assumed to . . . increase NO_x emissions by over 7%.”²⁵¹ This information fundamentally misinforms

²⁴⁶ *Id.* at 7716.

²⁴⁷ 2010 RFS RIA, *supra* note 1, at 604.

²⁴⁸ *Id.* at 507.

²⁴⁹ *Id.* at 507–08. (“[I]n our analysis for this final rule, we extended these effects to Tier 1 and NLEV cars and light trucks (through the 2003 model year) based on a recently published study from CRC.) (citing Coordinating Research Council, Effects of Vapor Pressure, Oxygen Content, and Temperature on CO Exhaust Emissions, CRC Report E-74b (2009) [hereinafter CRC Report E-74b], available at <http://bit.ly/1S3F2II>). The CRC E-74b program “was designed primarily to evaluate the effects of RVP and oxygenate content on exhaust CO emissions under conditions similar to those found in the Phoenix and Las Vegas areas during the winter on recent model -year vehicles.” CRC Report E-74B, at 1. The study only incidentally reported NO_x emission effects. *Id.* at 5. Moreover, the methodology used in the study, which match-blended T50 for ethanol-gasoline blends, is questionable and unnecessary. See Anderson et al., *supra* note 163.

²⁵⁰ *Id.* at 508.

²⁵¹ Cook et al., *supra* note 170, at 7716.

the public as to the nature of EPA's lifecycle findings with respect to tailpipe NO_x emissions, and should be corrected.²⁵²

More fundamentally, EPA's 2010 Lifecycle Analysis failed to fully account for the toxic effects of PM from aromatics, which ethanol reduces, and failed to account for the risk of aromatics when compared to other, less harmful toxics associated with ethanol. As discussed below, new evidence shows that blending ethanol into gasoline reduces or at least has no effect on most pollutants, with the exception of acetaldehyde, which is a relatively non-toxic irritant. Thus, the lifecycle air quality benefits of ethanol are much greater than EPA assumed in 2010.

1. Benzene, Toluene, Ethylbenzene, and Xylene (BTEX)

Benzene, toluene, ethylbenzene, and xylene (collectively, BTEX), are the main aromatic hydrocarbons currently added by refiners to gasoline boost fuel "octane."²⁵³ BTEX are emitted directly from the tailpipe and have carcinogenic and mutagenic effects.²⁵⁴ In addition, BTEX are an important source of secondary PM formation and ozone.²⁵⁵ Recent evidence suggests that BTEX exposure has negative health effects at much lower concentrations than EPA has deemed safe.²⁵⁶

²⁵² While EPA did not adopt all of its conclusions, EPA relied on a low-mitter study by Environment Canada concluding that E10 produced "higher emissions of other pollution species such as non-methane hydrocarbons (NMHCs), non-methane organic gas, acetaldehyde, benzene, and 1,3-butadiene." NAS Report, *supra* note 49, at 203 (citing Lisa A. Graham, *Emissions from Light Duty Gasoline Vehicles Operating on Low Blend Ethanol Gasoline and E85*, 42 Atmosph. Environ. 4498–4516 (2008)). This study is also incorrect.

²⁵³ Benzene, toluene, ethylbenzene, and xylene were designated as Hazardous Air Pollutants by the 1990 Amendments to the Clean Air Act. See 42 U.S.C. § 7412(b)(1).

²⁵⁴ Ashley L. Bolden et al., *New Look at BTEX: Are Ambient Levels a Problem?*, 49 Environ. Sci. & Tech. 5261, 5261 (2015).

²⁵⁵ See Katherine Von Stackelberg et al., *Public Health Impacts of Secondary Particulate Formation from Aromatic Hydrocarbons in Gasoline*, 12 Environ. Health 1, 1–2 (2013).

²⁵⁶ Bolden et al., *supra* note 254, at 5270.

A Health Effects Institute study recently concluded that “gasoline-powered vehicles are the main sources of VOCs (including BTEX) at the near-road sites.”²⁵⁷ In particular, gasoline exhaust is the source of between 70% to 100% of on- and near-road concentrations of VOCs, and the source of substantially all on- and near-road concentrations of BTEX.²⁵⁸

Because ethanol is a source of fuel octane, it reduces the need to add BTEX aromatics to the gasoline blendstock. EPA estimates that due to E10, the average aromatics content in summer gasoline has fallen by 4% to 5%, to about 24% to 25% of the total volume.²⁵⁹ Ethanol naturally reduces BTEX emissions because ethanol is a simple molecule that contains no aromatic hydrocarbons.²⁶⁰

New evidence from recent fuel studies overwhelmingly shows that blending ethanol into gasoline results in significant decreases in BTEX pollution. One vehicle study modeling fuel with different aromatic contents in both GDI and port fueled injection (PFI) engines recently concluded that raising the level of aromatics from 25% to 35% raises BTEX emissions by between 81% and 194%—and that further reducing aromatics delivers even larger BTEX reduction benefits.²⁶¹

²⁵⁷ Eric Fujita, Concentrations of Air Toxics in Motor Vehicle Dominated Environments, Health Effects Inst., Research Report No. 156, at 2 (Feb. 2011); *see also* Von Stackelberg, *supra* note 255, at 5 (“Source-specific speciation of total VOC in the 2005 National Emissions Inventory reveals that the U.S. emissions of single -ring aromatic hydrocarbons are 3.6 million tons per year, of which 69% are from gasoline-powered vehicles”).

²⁵⁸ Fujita, *supra* note 257, at 2 (“Apportionment of BTEX showed that gasoline was the dominant source (94% to 100%) for all on-road samples”).

²⁵⁹ Control of Air Pollution from Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards Final Rule, Regulatory Impact Analysis, at 3-5 (2014) [hereinafter Tier 3 RIA]; *see also*, Bolden et al., *supra* note 254, at 5261 (noting that recent studies show that in 1998, before ethanol was blended into gasoline, “BTEX collectively comprised as much as 27.5% of high octane at the pump”).

²⁶⁰ Aikawa et al., *supra* note 163, at 610–11.

²⁶¹ Georgios Karavalakis et al., *Evaluating the Effects of Aromatics Content in Gasoline on Gaseous and Particulate Matter Emissions from SI-PFI and SIDI Vehicles*, 49 Environ. Sci. & Tech. 7021, 7026

2. Particulate Matter (PM)

Gasoline exhaust is a “ubiquitous source of particulate matter.”²⁶² While EPA has historically associated PM_{2.5} emissions with diesel engines, “recent studies report that a substantial amount of PM emissions are produced not only by diesel engines, but by gasoline engines as well.”²⁶³ Moreover, direct injection technology is expected to dramatically increase the number and mass of fine (and particularly dangerous ultra-fine) PM emissions from motor vehicles.²⁶⁴

Blending ethanol into gasoline reduces PM emissions, in terms of both mass and particle number.²⁶⁵ This is mainly because ethanol displaces aromatics, which are responsible for most of the PM emissions from fuel combustion.²⁶⁶ Depending on the engine calibration, E10 can reduce PM mass emissions by up to 20% in new GDI

(2015). Raising the aromatics level from 15% to 35% raises BTEX emission by between 107% and 376%. *Id.*

²⁶² Tier 3 Rule, 79 Fed Reg. at 8440.

²⁶³ See Aikawa et al., *supra* note 163, at 617; Manufacturers of Emission Controls Association, Ultrafine Particulate Matter and the Benefits of Reducing Particle Number in the United States, available at <http://bit.ly/1RB1kks>.

²⁶⁴ *Id.* In GDI engines, fuel particles attach to (or impinge on) cylinders and pistons, preventing fuel from fully vaporizing and mixing with air during combustion, thereby increasing particle emissions. See Georgios Karavalakis et al., *Assessing the Impacts of Ethanol and Isobutanol on Gaseous and Particulate Emissions from Flex-Fuel Vehicles*, 48 Environ. Sci. Technol. 14016, 14021 (2014). For a discussion of the dangers of ultrafine particles, see A.B. Knol et al., *Expert Elicitation on Ultrafine Particles: Likelihood of Health Effects and Causal Pathways* 6 Particle Fibre Toxicol. at 2 (2009); EPA Integrated Science Assessment for Particulate Matter, at 5-3 & n.34 (2009) (“[T]he greater surface per unit volume of UFPs could potentially deliver relatively more adsorbed soluble components to cells,” and “may have more opportunity to interact with cell surfaces.”).

²⁶⁵ Anderson et al., *supra* note 163, at 1031.

²⁶⁶ Karavalakis et al., *supra* note 264, at 7027. Honda scientists have shown that PM is correlated with high-boiling, aromatic hydrocarbons in an empirical model. Aikawa et al., *supra* note 163.

engines, as compared to E0.²⁶⁷ Higher ethanol blends reduce PM even more.²⁶⁸ A recent study shows dramatic reductions in PM mass and number from transitioning to E83 in both GDI and PFI engines.²⁶⁹

3. Secondary Organic Aerosol (SOA)

Secondary Organic Aerosol (SOA), a species of secondary PM_{2.5}, is one of the major contributors to the PM_{2.5} burden in the United States, and it causes a range of negative health effects.²⁷⁰ Vehicle emissions represent the largest source of anthropogenic urban SOAs.²⁷¹

A growing body of scientific evidence shows that the entire SOA formation potential of gasoline is attributable to the aromatic hydrocarbons added to enhance fuel octane.²⁷² And recent EPA studies confirm that ethanol does not contribute to SOA.²⁷³

²⁶⁷ Maricq et al., *supra* note 170, at 580.

²⁶⁸ *Id.* at 581 (PM “decreases slightly from 0% to 17% ethanol, but falls by ~45% for E32 and E45.”).

²⁶⁹ Karavalakis et al., *supra* note 264, at 14021.

²⁷⁰ See Von Stackelberg et al., *supra* note 255, at 7-8; Lynn M. Russell et al., Secondary Organic Aerosol Formation from Fossil Fuel Sources Contribute Majority of Summertime Organic Mass at Bakersfield, *available at* <http://bit.ly/1phxwTE>.

²⁷¹ R. Bahreini et al., *Gasoline Emissions Dominate over Diesel in Formation of Secondary Organic Aerosol Mass*, 39 *Geophys. Res. Lett.* L06805 (2012); Michael J. Kleeman et al., *Source Apportionment of Secondary Organic Aerosol During a Severe Photochemical Smog Episode*, 41 *Atmos. Environ.* 576 (2007).

²⁷² Von Stackelberg et al., *supra* note 255, at 2; *see also id.* (“[E]vidence is growing that aromatics in gasoline exhaust are among the most efficient secondary organic matter precursors.”); L. Hildebrandt et al., *High Formation of Secondary Organic Aerosol from the PhotoOxidation of Toluene*, 9 *Atmos. Chem. & Phys.* 2973 (2009); Odum et al, *supra* note 164, at 96.

²⁷³ 2010 RFS RIA, *supra* note 1, at 575–81. EPA is currently conducting further studies on SOA. See Sherri Hunt, *Research Partnership Advancing the Science of Organic Aerosols* (June 19, 2013), *available at* <http://1.usa.gov/1U4vYc7>.

The health impacts of SOA formation from aromatics are dramatic: The Harvard study estimates that SOA carries a social cost of up to \$34.9 billion a year.²⁷⁴ To put this number in perspective, EPA estimated the 2010 RFS Rule's total monetized social costs of ozone and particulate matter at \$630 million to \$2.2 billion.²⁷⁵

While EPA's vehicular pollution controls reduce other primary pollutants, they do not significantly reduce SOA precursors.²⁷⁶ However, the SOA-forming potential of gasoline—and the associated PM_{2.5} burden—can be substantially reduced by substituting aromatic hydrocarbons with ethanol. As EPA has recognized, “[d]ue to the high octane quality of ethanol, it greatly reduces the need for . . . aromatics including toluene.”²⁷⁷ EPA's 2010 Lifecycle Analysis fails to account for these benefits, because EPA's widely used CMAQ model vastly underestimates the SOA-forming potential of gasoline—by a factor of at least 3.8.²⁷⁸

²⁷⁴ Von Stackelberg et al., *supra* note 255, at 6; Neal Fann et al., *The Influence of Location, Source, and Emission Type in Estimates of the Human Health Benefits of Reducing a Ton of Air Pollution* 2 Air Qual. Atmos. Health 169 (2009).

²⁷⁵ *Id.* at 5.

²⁷⁶ T.D. Gordon et al., *Secondary Organic Aerosol Formation Exceeds Primary Particulate Matter Emissions for Light Duty Gasoline Vehicles* 13 Atmos. Chem. Phys. Discuss. 23173, 23176, 23197 (2013) (finding that even though the contribution of light duty vehicle emissions to ambient PM levels is “dominated” by secondary SOA and nitrates, “catalysts are optimized to reduce emissions of regulated pollutants (NO_x, NMOG, and CO), not SOA precursors.”).

²⁷⁷ 2010 RFS RIA, *supra* note 1, at 579. EPA's own model also predicts that SOA from biogenic sources could be reduced by as much as 50% though reduction in anthropogenic sources of pollution, including mobile PM. Annmarie G. Carlton et al., *To What Extent Can Biogenic SOA Be Controlled?* 44 Environ. Sci. Technol. 3376 (2010).

²⁷⁸ Von Stackelberg et al., *supra* note 255, at 3.

4. Polycyclic Aromatic Hydrocarbons (PAHs)

The high-molecular weight PAHs present in gasoline are particularly dangerous to human health because they bond with ultra-fine particles and directly enter the bloodstream.²⁷⁹ According to EPA, “the majority of PAHs are adsorbed onto particles less than 1 [micrometer] in diameter.”²⁸⁰ SOAs coat and protect PAHs, turning them into long-range pollutants.²⁸¹ Gasoline particles are also a major source of PAH deposition in water, which has “increased by 200% to 300% over the last forty years and correlates with increased vehicle use.”²⁸²

Motor vehicle emissions are estimated to account for 46% to 90% of outdoor PAHs in urban areas.²⁸³ PAHs are emitted through vehicle tailpipes in either gas or particle form, as a result of the incomplete combustion of the aromatic fraction of gasoline.²⁸⁴ Because PAHs combust only at very high temperatures, they significantly increase the PM burden in urban and heavy-traffic areas.²⁸⁵ Indeed, fuel studies have

²⁷⁹ See Yuling Jia et al., *Estimated Reduction in Cancer Risk due to PAH Exposures If Source Control Measures during the 2008 Beijing Olympics Were Sustained*, 119 Environ. Health Perspect. 815, 820 (2011).

²⁸⁰ Tier 3 RIA, *supra* note 259, at 6-25 (2014).

²⁸¹ A. Zelenyuk et al., *Synergy Between Secondary Organic Aerosols and Long-Range Transport of Polycyclic Aromatic Hydrocarbons*, 46 Environ. Sci. Technol. 12459 (2012).

²⁸² Tier 3 RIA, *supra*, note 259, at 6-25.

²⁸³ Cathryn C. Tonne et al., *Predictors of personal polycyclic aromatic hydrocarbon exposures among pregnant minority women in New York City*, 112 Environ. Health Perspect. 754 (2004); *see also* Tier 3 RIA, *supra*, note 259, at 6-25 (“Major sources of PAHs include mobile sources.”)

²⁸⁴ Karavalakis et al., *supra* note 261, at 7021, 7027 (“Aromatic hydrocarbons are unsaturated compounds with a benzene ring-like structure and are known to form polycyclic aromatic hydrocarbons (PAHs), which are precursors of soot particles Aromatic compounds can act as seed molecules for molecular growth and polymerization to form larger hydrogen-deficient molecules (PAHs) that produce soot.”); *see also* Tier 3 RIA, *supra*, note 259, at 6-25.

²⁸⁵ Karavalakis et al., *supra* note 261, at 7027.

shown that PM emissions from gasoline-powered vehicles are overwhelmingly made up of PAHs.²⁸⁶

Blending ethanol to displace octane-enhancing aromatics has been shown to reduce PAH emissions—one recent study find that E10 reduces PAH emissions by approximately 70%, and that E85 reduces PAHs by 85%, relative to E0.²⁸⁷ EPA’s 2010 Lifecycle Analysis fails to account for this reduction because it does not account for PAH emissions at all.

5. Nitrogen Oxide (NO_x)

EPA’s 2010 assessment of the lifecycle emissions effects of the RFS was wrong to assume E10 increased NO_x emissions.²⁸⁸ EPA’s own scientists have noted that ethanol decreases NO_x in modern vehicles equipped with oxygen sensors that can control and calibrate air-fuel ratios.²⁸⁹ The effect of ethanol on NO_x emissions depends on engine calibration: In vehicles with oxygen sensors, the effect of E10 on NO_x emissions is not significant—indeed, studies show that NO_x actually decreases

²⁸⁶ Aikawa et al., *supra* note 163, at 610, 611 (“PN increased in a majority of gasoline blends to which hydrocarbons had been added. Partly because only hydrocarbons were added to the gasoline, . . . all of the additional PN is considered a PAH (polycyclic aromatic hydrocarbon) with a high boiling point or soot. The higher the boiling point hydrocarbon added, the more the PN increases. This trend is particularly notable with aromatic substances.”).

²⁸⁷ M.A. Costagliola et al., *Combustion Efficiency and Engine Out Emissions of a S.I. Engine Fueled with Alcohol/Gasoline Blends*, *Applied Energy* 1, 9 & fig. 17 (2012) (finding “reduction of toxic equivalents [of the carcinogenic PAH benzo(a)pyrene (B(a)p)] when moving from gasoline to alcohol blends,” including a 60% to 70% reduction for splash blended E10, E20, and E30 as compared to gasoline, with even better results for E85); *see also* Dabrina D. Dutcher et al., *Emissions from Ethanol-Gasoline Blends: A Single Particle Perspective* 2 *Atmosphere* 195 (2011).

²⁸⁸ *Cf.* 2010 RFS RIA, *supra* note 1, at 508 (assuming a NO_x increase of over 7% in Tier 2 and earlier vehicles).

²⁸⁹ *See* Mathew Brusstar (EPA) & Marco Bakenhaus, *Economical High-Efficiency Engine Technologies for Alcohol Fuels* (Presented at ISAF XV International Symposium on Alcohol Fuels, Sep. 28, 2005), <http://1.usa.gov/1XeaEil>.

when a properly calibrated modern vehicle transitions from E0 to E10.²⁹⁰ This is probably due to the fact that ethanol displaces heavy aromatics which tend to form chamber deposits, increasing NO_x tailpipe emissions.²⁹¹

6. Volatile Organic Compounds

Some studies that associated ethanol tailpipe emissions with increased ozone do so in part because of VOC evaporative emissions from adding ethanol, because adding small amounts of ethanol to fuel results in an increase in the volatility of the fuel, as measured by Reid Vapor Pressure (RVP).²⁹² The attribution of this effect to ethanol is arbitrary, however; the increase in the RVP is due to the azeotropic behavior of ethanol in combination with aromatics.²⁹³ The chemical effect could just as well be attributed to aromatics.²⁹⁴

More importantly, increasing ethanol content above 10% reduces the RVP of the fuel, lowering VOC emissions.²⁹⁵

²⁹⁰ Carolyn Hubbard et al., *Ethanol and Air Quality: Influence of Fuel Ethanol Content on Emissions and Fuel Economy of Flexible Fuel Vehicles* 48 Environ. Sci. & Tech. 861, 861 (2014); Maricq et al., *supra* note 170, at 580 (finding decreases in NO_x emissions of “about 20%” when the ethanol content of fuel is increased from 0% to 17% or higher).

²⁹¹ See Health Effects Institute, *Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects* 3 (2010).

²⁹² See, e.g., NAS Report, *supra* note 49, at 203 (citing National Research Council, National Academy of Sciences, *Ozone-Forming Potential of Reformulated Gasoline* (1999); Mark Z. Jacobson, *Effects of Ethanol (E85) Versus Gasoline Vehicles on Cancer and Mortality in the United States* 2 Environ. Sci. & Tech. 148 (2009).

²⁹³ Anderson et al., *supra* note 163, at 1029–30.

²⁹⁴ *Id.*

²⁹⁵ *Id.*; Karavalakis et al., *supra* note 264, at 14021.

F. Future Fuels

Blending ethanol into gasoline has reduced air pollution by displacing aromatics. However, recent evidence shows that transitioning from a blend of E10 to a mid-level blend of approximately 30% ethanol (E30) would further reduce pollutant tailpipe and evaporative emissions. Many studies have established that mid-level ethanol blends would reduce PM mass and number,²⁹⁶ BTEX,²⁹⁷ NO_x,²⁹⁸ and other pollutants to an even greater extent than E10.²⁹⁹ Additionally, blending a higher volume of ethanol into gasoline would reduce the RVP of the fuel mixture, which would reduce evaporative emissions.³⁰⁰ In addition to lowering fuel consumption and reducing GHG emissions, mid-level ethanol blends could provide a smooth transition to cleaner fuels, significantly advancing the Clean Air Act's overarching goal of promoting the "public health and welfare and the productive capacity of the population."³⁰¹

In sum, the weight of the evidence shows that transitioning to mid-level ethanol blends would dramatically reduce tailpipe emissions of aromatics, particle

²⁹⁶ Karavalakis et al., *supra* note 264, at 14021; Costagliola et al., *supra* note 287, at 9; Maricq et al., *supra* note 170, at 580.

²⁹⁷ See, e.g., Karavalakis et al., *supra* note 264, at 14020 ("Benzene emissions for E83 showed statistically significant decreases of 60% and 58%, respectively, relative to E10 and E51. For toluene, ethylbenzene, m/p-xylene, and o-xylene compounds as a group, the statistically significant reductions in emissions ranged from 66% to 85% for E83 compared to E10, from 66% to 84% for E83 compared to E51"); Costagliola et al., *supra* note 287, at 9; Maricq et al., *supra* note 170, at 580.

²⁹⁸ Hubbard et al., *supra* note 290.

²⁹⁹ E15 also reduces butadiene and formaldehyde relative to E10, despite recent EPA model predictions to the contrary. Anderson et al., *supra* note 163, at 1034. E15 is difficult to commercialize because EPA has chosen to deny the one-pound RVP waiver for E15 fuels. See Jeremy P. Greenhouse, *E15: Cracking the RVP Nut: New Blend Won't Qualify for One Pound Waiver, Presenting Huge Hurdle*, Ethanol Producer Mag. (Oct. 18, 2011).

³⁰⁰ Anderson et al., *supra* note 163, at 1029–30; Stein et al., *supra* note 168.

³⁰¹ 42 U.S.C. § 7401(a)-(b).

mass and number, NO_x, VOCs, and ozone. But EPA's 2010 Lifecycle Analysis and its 2011 Report to Congress entirely fail to account for the benefits of mid-level blends.³⁰² By continuing to disseminate this short-sighted information, EPA fails to present information "in an accurate, clear, complete, and unbiased manner" as the Information Quality Guidelines require.³⁰³

1. BTEX

BTEX would be reduced through the use of mid-level biofuel blends. The University of California has shown that a fuel blend of 51% ethanol (E51) reduces benzene, toluene, and xylene relative to E10, and the reductions are greater in even higher ethanol blends.³⁰⁴ This is particularly important because, BTEX are highly carcinogenic,³⁰⁵ and because they contribute to ozone and SOA.³⁰⁶

BTEX emissions are correlated with aromatics content, so replacing aromatics with ethanol reduces BTEX emission.³⁰⁷ Raising total aromatics content from 15% to 25% raises BTEX emissions by about 52% to 103%.³⁰⁸

³⁰² EPA curtly discussed infrastructure issues related to the deployment of EPA, but EPA consciously disregarded evidence of the pollution benefits of midlevel blends in light of a pending application for an E15 waiver. *See* 2010 RFS RIA, *supra* note 1, at 256–57.

³⁰³ Information Quality Guidelines, *supra* note 14, at 14.

³⁰⁴ Georgios Karavalakis et al., *Assessing the Impacts of Ethanol and Isobutanol on Gaseous and Particulate Emissions from Flexible Fuel Vehicles*, 48 *Envtl. Sci. & Technol.* 14016, 14021 (2014).

³⁰⁵ *See supra* note 254 & accompanying text.

³⁰⁶ *See supra* note 255 & accompanying text.

³⁰⁷ E15, which is currently legal but practically unavailable, reduces benzene emissions. Anderson et al., *supra* note 163, at 1034.

³⁰⁸ Karavalakis et al., *supra* note 261, at 7027. *See also* Stein et al., *supra* note 168.

2. PM and PN

Mid-level ethanol blends would facilitate dramatic reductions in PM tailpipe emissions. In general, ethanol reduces PM because it replaces aromatic hydrocarbons with high double bond equivalent (DBE) values which “disproportionately contribute to PM formation.”³⁰⁹ But ethanol also tends to reduce PM for two additional reasons: first, ethanol’s relatively high vapor pressure and low boiling point (78°C), allow it to reduce the boiling point of the fuel mixture, improving combustion; second, ethanol’s higher oxygen content helps it to promote leaner combustion and avoids the impingement of soot in GDI engines.³¹⁰

Numerous studies confirm that in both GDI and port fuel injection (PFI) engines, mid-level ethanol blends reduce PM mass and particle number (PN) emissions.³¹¹ A recent University of California study found that E51 reduced PM mass emissions by 61% and reduced PN emission by 50%, relative to E10.³¹² The study attributed these emissions reductions to “the increased oxygen content of the fuel which facilitates more complete combustion, or the lower hydrocarbon content.”³¹³

Many other studies corroborate these predictions. Oak Ridge Laboratory studies conducted in 2010 and 2012 show that E20 reduces average PM and PN

³⁰⁹ Stein et al., *supra* note 168, at 11. Double bond equivalent value, or DBE, is a measure of the number of double bonds and rings in the fuel molecule, defined as the number of hydrogen atoms which would be required to fully saturate the molecule. *Id.*

³¹⁰ *Id.*

³¹¹ Anderson et al., *supra* note 163, at 1031 (collecting studies).

³¹² Karavalakis et al., *supra* note 304, at 14021, 14022.

³¹³ *Id.* at 14021.

relative to E10 and E0.³¹⁴ A more recent Oak Ridge study confirms that E30 also reduces PM and PN.³¹⁵ Another recent study found that transitioning to higher ethanol blends could cut PN emissions in half.³¹⁶ A Ford Motor Company study of GDI engines also found that raising ethanol content to about 30% lowers PM and PN by 30% to 40%.³¹⁷ In another study, raising aromatics content from 15% to current levels of 25% was found to raise PM mass emissions by 148%.³¹⁸

3. NO_x, VOCs, and Ozone

Mid-level ethanol blends would also reduce emissions of NO_x and organic compounds that contribute to ozone. The 2014 Ford study found that non-methane organic gases (NMOG) and total hydrocarbon emissions “exhibit a clear minimum around E20-E40,” lowering emissions from a flex-fuel vehicle by 25% and 35% relative to E0 and E80.³¹⁹ Moreover, in modern vehicles calibrated to sense the higher oxygen content of ethanol, “emissions of NO_x decreased by approximately 70% as the ethanol content increased from E0 to E20-E40.”³²⁰ As the Ford study concludes, the emissions results of mid-level ethanol blends “point to future opportunities for emission reductions of [ozone] from FFVs.”³²¹ EPA’s 2010

³¹⁴ John M. Storey et al., *Exhaust Particle Characterization for Lean and Stoichiometric DI Vehicles Operating on Ethanol-Gasoline Blends*, SAE Tech. Paper (2012); John M. Storey et al., *Ethanol Blend Effects On Direct Injection Spark-Ignition Gasoline Vehicle Particulate Matter Emissions*, 3 SAE Int. J. Fuels Lubr. 650 (2010).

³¹⁵ John M. Storey et al., *Novel Characterization of GDI Engine Exhaust for Gasoline and MidLevel Gasoline Alcohol Blends*, 7 SAE Int. J. Fuels Lubr. 571 (2014).

³¹⁶ Costagliola et al., *supra* note 287, at 6.

³¹⁷ Maricq et al., *supra* note 170.

³¹⁸ Karavalakis et al., *supra* note 261, at 7027.

³¹⁹ Hubbard et al., *supra* note 290, at C.

³²⁰ *Id.* at E.

³²¹ *Id.* at F. This is consistent with other studies. For example, a 2010 Honda study testing emissions in a GDI light-duty vehicle found that E45 reduced NO_x and hydrocarbon emissions by 20%. Maricq et al., *supra* note 170, at 580.

Lifecycle Analysis and 2011 Report to Congress presents incomplete information by neglecting the added benefits of mid-level ethanol blends.

CONCLUSION

A lifecycle analysis used by the primary environmental regulator and submissions to Congress should reflect the most up-to-date scientific research. The data and studies that were available to EPA in 2010 were inaccurate, and they are now obsolete. A careful analysis of the best available science at every stage in the lifecycles of gasoline and ethanol clearly establishes the emissions reductions that ethanol has already achieved, and the even more substantial reductions that it can achieve in the future.

The social benefits of ethanol are great. Even though EPA grossly underestimated ethanol's emissions reduction potential, the Agency still found in 2010 that blending ethanol into gasoline reduces lifecycle GHG emissions, and that the monetized annual benefits of the RFS's GHG reduction (\$600 million to \$12.2 billion, depending on the social cost of carbon³²²) exceed the relatively small air quality costs that EPA predicted from ethanol's effect on conventional air pollution (\$630 million to \$2.2 billion³²³).

But ethanol's benefits are even greater than EPA predicted in 2010. The best available science demonstrates that ethanol's carbon intensity is significantly lower (36.62g or less instead of 74.81g CO₂e/MJ) and gasoline's significantly higher (96.89g instead of 93.01g CO₂e/MJ) than EPA predicted.³²⁴

³²² 2010 RFS RIA, *supra* note 1, at 6 (estimate for 2022, the first year in which the RFS would be fully phased in).

³²³ *Id.*

³²⁴ *See supra* p. 42.

By the same token, air pollution costs associated with ethanol production are easily overwhelmed by ethanol's air quality benefits in light of the toxic aromatics that ethanol displaces, innovations in corn agriculture and ethanol production, and increasingly dirty gasoline extracted in the United States.³²⁵

Consistent with its Information Quality Guidelines, EPA must correct the inaccuracies reflected in its 2010 Lifecycle Analysis and its 2011 Report to Congress to reflect the best available science.

³²⁵ See *supra* pp. 41–63.

APPENDIX I

GREET 1 2015 Land Use Change for Corn Ethanol

Default Values: Corn Ethanol 2011 Case, Conventional Till,

8.3) CO₂ Emission Estimates from Land Use Changes and Land Management Changes of Farming: grams/gal of ethanol

8.3.a) Land Use Change Scenario Options

Select Corn Ethanol Case	Corn Ethanol 2011
Select Domestic Emissions Modeling Scenario	Century
Select International Emissions Modeling Scenario	Winrock
Domestic Emissions Modeling Scenario	yield_increase
Soil depth considered in modeling	100 cm
Harvested Wood Product (HWP) Scenario	HEATH
Land Management Practice for Corn and Corn Stover Production	Conventional Till
Forest Prorating Factor	Yes

8.3.c) CO₂ Emissions from Potential Land Use Changes of Farming: grams/gal of Ethanol

	Corn
Inclusion of CO ₂ Emissions from Land Use Change	2
Domestic (Data Cell)	212
Foreign (Data Cell)	399
Domestic (Grams/Mj)	2.64
Foreign (Grams/Mj)	4.95
Total LUC (Grams/Mj)	7.59

Scenario 1 – Use Corn Ethanol 2013 Case

8.3) CO₂ Emission Estimates from Land Use Changes and Land Management Changes of Farming: grams/gal of ethanol

8.3.a) Land Use Change Scenario Options

Select Corn Ethanol Case	Corn Ethanol
Select Domestic Emissions Modeling Scenario	2013
Select International Emissions Modeling Scenario	Century
Domestic Emissions Modeling Scenario	Winrock
Soil depth considered in modeling	yield_increased
Harvested Wood Product (HWP) Scenario	100 cm
Land Management Practice for Corn and Corn Stover Production	HEATH
Forest Prorating Factor	Conventional Till
	Yes

8.3.c) CO₂ Emissions from Potential Land Use Changes of Farming: grams/gal of Ethanol

	Corn
Inclusion of CO ₂ Emissions from Land Use Change	2
Domestic (Data Cell)	-156
Foreign (Data Cell)	413
Domestic (Grams/Mj)	-1.93
Foreign (Grams/Mj)	5.12
Total LUC (Grams/Mj)	3.19

Scenario 2 – Corn Ethanol 2013, Reduced Till

8.3) CO₂ Emission Estimates from Land Use Changes and Land Management Changes of Farming: grams/gal of ethanol

8.3.a) Land Use Change Scenario Options

Select Corn Ethanol Case
 Select Domestic Emissions Modeling Scenario
 Select International Emissions Modeling Scenario
 Domestic Emissions Modeling Scenario
 Soil depth considered in modeling
 Harvested Wood Product (HWP) Scenario
 Land Management Practice for Corn and Corn Stover Production
 Forest Prorating Factor

Corn Ethanol
2013
Century
Winrock
yield_increase
100 cm
HEATH
Reduced-Till
Yes

8.3.c) CO₂ Emissions from Potential Land Use Changes of Farming: grams/gal of Ethanol

	Corn
Inclusion of CO ₂ Emissions from Land Use Change	2
Domestic (Data Cell)	-180
Foreign (Data Cell)	413
Domestic (Grams/Mj)	-2.24
Foreign (Grams/Mj)	5.12
Total LUC (Grams/Mj)	2.89

Scenario 3 – Corn Ethanol 2013 Base Case, No-Till

8.3) CO₂ Emission Estimates from Land Use Changes and Land Management Changes of Farming: grams/gal of ethanol

8.3.a) Land Use Change Scenario Options

Select Corn Ethanol Case
 Select Domestic Emissions Modeling Scenario
 Select International Emissions Modeling Scenario
 Domestic Emissions Modeling Scenario
 Soil depth considered in modeling
 Harvested Wood Product (HWP) Scenario
 Land Management Practice for Corn and Corn Stover Production
 Forest Prorating Factor

Corn Ethanol
2013
Century
Winrock
yield_increas
100 cm
HEATH
No-Till
Yes

8.3.c) CO₂ Emissions from Potential Land Use Changes of Farming: grams/gal of Ethanol

	Corn
Inclusion of CO ₂ Emissions from Land Use Change	2
Domestic (Data Cell)	-239
Foreign (Data Cell)	413
Domestic (Grams/Mj)	-2.97
Foreign (Grams/Mj)	5.12
Total LUC (Grams/Mj)	2.15

APPENDIX II

Study & Year	Clay et al (2012 Long-Term) ⁱ	Clay et al (2015) ⁱⁱ	Follett et al (2012) ⁱⁱⁱ	Halvorson & Stewart (2015) ^{iv}
Soil Depth	0-15 cm	0-30 cm	0-150 cm	0-60 cm
Tillage	Various	No-Till & Chisel	No-Till	No-Till
Study Length (years)	25	5	9	7
SOC gain (Mg. /Ha./Yr.) ^v	0.368	0.53	2.6	0.856
Avg. Corn Yield in Study (Bushels/Ha./Yr.) ^{vi}	334	449	240	347
Ethanol Yield (Gallons/Bushel) ^{vii}	921	1240	663	959
Ethanol Energy Yield (MJ/Gallon) ^{viii}	74,144	99,826	53,378	77,214
Grams Soil Carbon /MJ ^x	4.96	5.31	48.71	11.09
C to CO ₂ conversion (CO = C * 3.664) ^x	3.664	3.664	3.664	3.664
Credit in Grams CO₂ eq./MJ^{xi}	18.19	19.45	178.47	40.62

ⁱ Clay, *Carbon Sequestration*, *supra* note 110. The 2012 Clay paper includes two studies. The first, a seven-year study, estimated that surface soil carbon sequestration reduces the carbon intensity of corn ethanol by as much 19.6g CO₂e/MJ in the North-Central and Southeast regions of North Dakota. *Id.* at 769 The data in this study is based on the second study, a twenty-five year study.

ⁱⁱ Clay et al., *Tillage and Corn Residue*, *supra* note 110.

ⁱⁱⁱ Follett et al., *supra* note 113.

^{iv} Halvorson & Stewart, *supra* note 117.

^v Soil Organic Carbon (SOC) gain is expressed in annual Megagrams (Mg.) (1 Mg. = 1,000 Kg.) of carbon sequestered per year, per hectare (ha.). The .368 Mg. SOC for Clay's 2012 study is based on the reported average over the 25 years of the study. Clay et al., *Carbon Sequestration*, *supra* note 110, at 768 ("[D]uring the past 25 yr, surface SOC amounts have increased at an average rate of 368 kg C (ha × yr).⁻¹"). The 2.65 Mg. SOC gain for Clay's 2015 study is based on the average SOC gain, with no stover removal. Clay et al., *Tillage and Corn Residue*, *supra* note 110, at 808 ("[I]n the combined 0- to 15- and 15- to 30-cm soil zones . . . 2.65 Mg SOC ha⁻¹ were sequestered . . . in the 0% residue removal treatment[.]"). The 2.6 Mg. SOC gain for Follett's study is based on the observed gain applying 120 kg/ha of nitrogen fertilizer, with no stover removal. Follett et al., *supra* note 113, at 873 ("At the 120 kg ha⁻¹ N fertility rate with no stover harvest, the annual increase in soil C was 2.6 Mg ha⁻¹ year.⁻¹[.]"). The .856 Mg. SOC gain figure for Halvorson & Stewart's study is based on the annual average, with no stover removal. Halvorson & Stewart, *supra* note 117, at 1510 ("The estimated annual rate of SOC gain from the FR [full stover retained] treatments over the 7yr of this study would have been . . . 856 kg C h⁻¹ from the . . . 0 to 60-cm soil depths.").

^{vi} One bushel equals 25.40 kg of corn grain. See Iowa State, Ag Decision Maker Metric Conversions, C6-80 (May 2013), *available at* <http://bit.ly/1VxnEks>. The average yield for Clay's 2012 study is based on USDA historical data for the counties tested. Nat'l Agric. Research Serv., Quick Stats, *available at* http://www.nass.usda.gov/Quick_Stats/; see also Clay et al., *Carbon Sequestration*, *supra* note 110, at 768 & fig. 6. The average yield for Clay's 2015 study is based on the reported yield of 11,408 kg. per ha., with no stover removal. Clay et al., *Tillage and Corn Residue*, *supra* note 110, at 806, Table 1. The average yield for Follett's study is based on the reported figure for corn grain using 120 kg of nitrogen fertilizer per ha., with no stover removal. Follett 2012, *supra* note 113, at 873. The average yield for Halvorson & Stewart's study is 8,824 kg. per ha., with no stover removal. Halvorson & Stewart, *supra* note 117, at 1507.

^{vii} The ethanol yield is based on the USDA's average yield of 2.76 gallons per bushel in 2010, multiplied by the number of bushels produced every year. 2015 Energy Balance for the Corn-Ethanol Industry, USDA, Table 1 (Feb. 2016).

^{viii} The ethanol energy yield is based on multiplying the ethanol yield by the heating value of undenatured ethanol used by CARB: 80.53 MJ per gallon of ethanol. CARB, Calculation of Denatured Ethanol CI and CA RFG, <http://bit.ly/1oCEj9k>.

^{ix} Grams of soil carbon are derived by converting Mg. SOC gain into grams and dividing it by the ethanol energy yield.

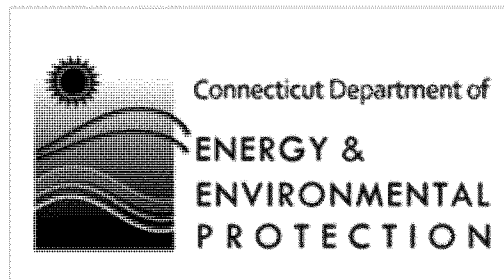
^x The carbon to CO₂ conversion factor is based on a molecular weight conversion from carbon to CO₂: 1 gram of carbon = 3.66 4g CO₂. See Carbon Dioxide Information Analysis Center, Conversion Tables, Oak Ridge Nat'l Lab., Table 3, <http://cdiac.ornl.gov/pns/convert.html>.

^{xi} The carbon impact credit is arrived at by multiplying the carbon conversion factor by grams of soil carbon per MJ.

To: Rupp, Mark[Rupp.Mark@epa.gov]; Purchia, Liz[Purchia.Liz@epa.gov]; McCabe, Janet[McCabe.Janet@epa.gov]
From: Fritz, Matthew
Sent: Thur 4/7/2016 3:45:38 PM
Subject: FW: Press release we are issuing - FYI
[image005.emz](#)

FYI

From: Schain, Dennis [mailto:Dennis.Schain@ct.gov]
Sent: Thursday, April 07, 2016 11:44 AM
To: Fritz, Matthew <Fritz.Matthew@epa.gov>
Subject: Press release we are issuing - FYI



For Information Contact:

Dennis Schain, 424-3110

April 7, 2016

P R E S S R
E L E A S E

States Urge EPA to Require Upwind States to Act on Air Pollution

Nine state letter to EPA urges action on a petition filed in 2013

Connecticut and eight other states have sent a letter to the U.S. Environmental Protection Agency (EPA) urging immediate action to require nine upwind states to address air pollution generated within their borders that causes air quality and public health issues in downwind states.

In a letter to EPA Administrator Gina McCarthy, environmental commissions of nine Northeast and Mid-Atlantic states asked EPA to act on a petition they had filed on December 10, 2013, seeking to add nine upwind states – Illinois, Indiana, Kentucky, Michigan, North Carolina, Ohio, Tennessee, Virginia, and West Virginia – to the Ozone Transport Region (OTR).

Granting the petition, and adding the nine upwind states to the OTR, would require them to install and operate the same air pollution controls that are required from similar sources in the Northeast and Mid-Atlantic states and improve air quality in both upwind and downwind states.

Under Section 176A of the federal Clean Air Act, states can petition the EPA to add any state to an air quality region such as the OTR if there is reason to believe it is the source of pollution-causing violations of air quality standards elsewhere. The EPA Administrator was required to approve or disapprove the petition by June 10, 2015, but action was postponed as the states entered into a collaboration to craft a resolution to eliminate the need for the petition.

While the collaboration was able to obtain voluntary emissions reductions from power plants in some upwind states during the 2015 ozone season, it was but unable to achieve legally enforceable control measures to address ozone transport for 2016 and beyond. As a result, the petitioning states have asked EPA to take formal action on and to grant the petition.

“Connecticut continues to measures the highest ozone levels in the northeast affecting the health of our citizens. Over 90% of our air pollution comes from out of state on ‘bad air’ days. Over the past year, DEEP has worked with the upwind states with the goal of achieving a satisfactory resolution to reduce interstate air pollution transport, but we have come to an impasse. The continued lack of meaningful and binding emissions reductions puts the health and welfare of our citizens at continued risk. It’s now time for EPA to act,” said Commissioner Rob Klee, of

Connecticut's Department of Energy and Environmental Protection.

“During the past few decades, Connecticut and other states in the Northeast and Mid-Atlantic regions have spent tens of billions of dollars to reduce air emissions,” said Klee. “It is now time for the upwind states to make similar investments so that their power plants and industrial facilities operate in a clean and efficient manner and stop spewing pollution that is carried over our borders and into the lungs of Connecticut’s residents.”

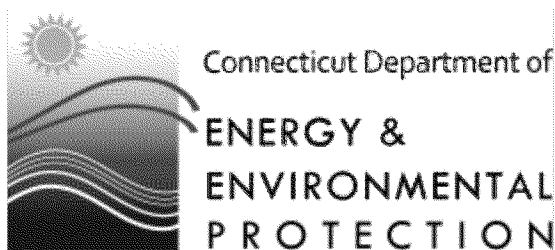
The States who filed the petition are: Connecticut, Delaware, Maryland, Massachusetts, New Hampshire, New York, Pennsylvania, Rhode Island, and Vermont are all current members of the OTR.

Dennis Schain

Communications Director

Connecticut Department of Energy and Environmental Protection
79 Elm Street, Hartford, CT 06106-5127

P: 860.424.3110 | C: 860.462.3468 | F: 860.424.4053 | E: dennis.schain@ct.gov



www.ct.gov/deep

Conserving, improving and protecting our natural resources and environment;

Ensuring a clean, affordable, reliable, and sustainable energy supply.

To: McCabe, Janet[McCabe.Janet@epa.gov]
From: McCabe, Janet
Sent: Thur 4/7/2016 3:23:40 AM
Subject: PM Imp Rule jm 4-3-16.docx
PM Imp Rule jm 4-3-16.docx

**Connecticut Department of Energy and Environmental Protection
Delaware Department of Natural Resources and Environmental Control
Maryland Department of the Environment
Massachusetts Department of Environmental Protection
New Hampshire Department of Environmental Services
New York State Department of Environmental Conservation
Pennsylvania Department of Environmental Protection
Rhode Island Department of Environmental Management
Vermont Department of Environmental Conservation**

April 6, 2016

Ms. Gina McCarthy, EPA Administrator
United States Environmental Protection Agency Headquarters
William Jefferson Clinton Building
1200 Pennsylvania Avenue, N.W.
Mail Code: 1101A
Washington, DC 20460

Dear Ms. McCarthy:

On December 10, 2013, Connecticut, Delaware, Maryland, Massachusetts, New Hampshire, New York, Pennsylvania, Rhode Island and Vermont sent you, as the Administrator of the U.S. Environmental Protection Agency (EPA), a petition, pursuant to section 176A of the Clean Air Act (Act), to add Illinois, Indiana, Kentucky, Michigan, North Carolina, Ohio, Tennessee, Virginia and West Virginia to the Ozone Transport Region (OTR) established pursuant to section 184 of the Act. We also requested that EPA provide an opportunity for public participation, including public notice and comment, with regard to the petition. To date, EPA has not acted on either request despite a legal obligation to have done so by June 10, 2015.

States within the OTR have adopted stringent emissions controls at significant cost on a statewide basis. Continued nonattainment of the ozone National Ambient Air Quality Standards (NAAQS) threatens public health, burdens our economies and deters economic growth. States outside of the OTR are only required to install the most basic controls in nonattainment areas. This letter requests that EPA take immediate action to grant the December 10, 2013 petition because expansion of the OTR will aid in addressing ozone transport which will result in more reductions of precursor emissions that significantly contribute to ozone nonattainment in our states and would result in a fairer distribution of the burden of controlling this pollution.

The original petition, and the technical support document that accompanied it, relied heavily on EPA's significant contribution analysis for the 2011 Cross-State Air Pollution Rule (CSAPR) for the 2008 ozone NAAQS, which clearly identified non-OTR states that significantly contribute to nonattainment in the current OTR. More recently, technical support documents and associated data files¹ for the proposed update to CSAPR (80 FR 75706; December 3, 2015) show that most of the upwind states named in the petition continue to significantly contribute to ozone nonattainment in the OTR.

While EPA's proposed update to CSAPR supports states' obligations to address air pollution transported across state lines and helps address EPA's role in backstopping states' obligations under the Clean Air Act, it is only a partial remedy, meaning that it does not fully address the problem of transported ozone pollution in the East. In fact, EPA's modeling for the CSAPR update projects continued nonattainment of the ozone NAAQS in the New York-Northern New Jersey-Long Island, NY-NJ-CT area, and renewed nonattainment in the Baltimore, Maryland area in 2017; with interstate transport from upwind states continuing to contribute significantly to that nonattainment². Without a full remedy at the federal level, the upwind states have demonstrated little interest in implementing meaningful emission reduction measures in their Good Neighbor State Implementation Plans beyond what is specified by CSAPR. Indeed, the named upwind states have thus far declined to commit to any additional legally enforceable measures to address ozone transport. In addition, we remind EPA that it is critical to promptly finalize a full transport remedy that requires states contributing to downwind ozone nonattainment to implement additional enforceable control measures as necessary to help downwind areas meet their attainment requirements.

States that are added to the OTR will be required to implement measures, including reasonably available control technology, designed to reduce ozone levels. Accordingly, granting the petition will also facilitate efforts to meet the 2015 ozone NAAQS as well as future updates to the NAAQS.

In conclusion, given current ozone nonattainment in the OTR, projected nonattainment in the OTR in 2017, and a proposed federal transport rule that only partially addresses ozone transport, we strongly urge EPA to grant the December 10, 2013 petition to expand the OTR.

¹ <http://www.epa.gov/airmarkets/proposed-cross-state-air-pollution-update-rule>

² See "Data File with 2017 Ozone Contributions (XLS)" at <http://www.epa.gov/airmarkets/proposedcross-state-air-pollution-update-rule>


Sincerely,

A handwritten signature in cursive script, appearing to read "Robert Klee".

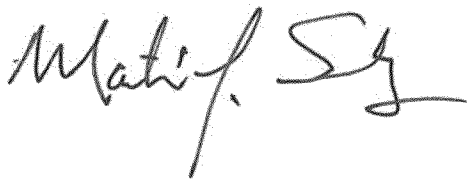
Robert Klee, Commissioner
Connecticut Department of Energy and Environmental Protection

A handwritten signature in cursive script, appearing to read "David Small".

David Small, Secretary
Delaware Department of Natural Resources and Environmental Control

A handwritten signature in cursive script, appearing to read "Ben Grumbles".

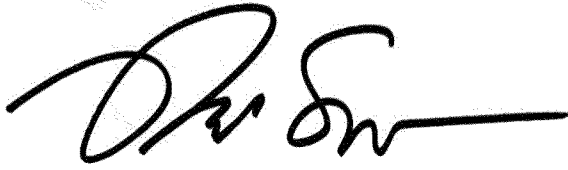
Benjamin Grumbles, Secretary
Maryland Department of the Environment

A handwritten signature in cursive script, appearing to read "Martin Suuberg".

Martin Suuberg, Commissioner
Massachusetts Department of Environmental Protection

A handwritten signature in cursive script, appearing to read "Thomas Burack".

Thomas Burack, Commissioner
New Hampshire Department of Environmental Services



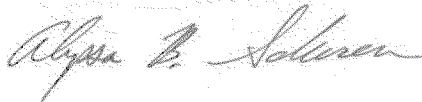
Basil Seggos, Acting Commissioner
New York State Department of Environmental Conservation



John Quigley, Secretary
Pennsylvania Department of Environmental Protection



Janet Coit, Director
Rhode Island Department of Environmental Management



Alyssa Schuren, Commissioner
Vermont Department of Environmental Conservation

cc: Lisa Bonnett, Illinois Environmental Protection Agency
Carol S. Comer, Indiana Department of Environmental Management
R. Bruce Scott, Kentucky Department of Environmental Protection
Keith Creagh, Michigan Department of Environmental Quality
Don van der Vaart, North Carolina Dept. of Environment & Natural Resources
Craig W. Butler, Ohio Environmental Protection Agency
Bob Martineau, Tennessee Department of Environment and Conservation
David Paylor, Virginia Department of Environmental Quality
Randy Huffman, West Virginia Department of Environmental Protection

To: Johnston, Khanna[Johnston.Khanna@epa.gov]
Cc: Wortman, Eric[Wortman.Eric@epa.gov]; Zawlocki, Chris[Zawlocki.Chris@epa.gov]; Noonan, Jenny[Noonan.Jenny@epa.gov]; Millett, John[Millett.John@epa.gov]; Stewart, Lori[Stewart.Lori@epa.gov]; Harrison, Melissa[Harrison.Melissa@epa.gov]; Rupp, Mark[Rupp.Mark@epa.gov]; McCabe, Janet[McCabe.Janet@epa.gov]
From: Drinkard, Andrea
Sent: Tue 4/5/2016 7:22:01 PM
Subject: Materials for the Thursday RA Call
[Qs on CPP SCOTUS for regions April 2016.docx](#)
[GM Quick Facts C&H 3.31.16.docx](#)
[TPs FinalRelease CHA draft 2016-04-01.docx](#)

Hi Khanna,

Please find attached an updated Q&A document that can be provided to the RAs. I'm also including two files on the Climate Health Assessment that the RAs may already have, but wanted to make sure they had them handy for the call since Janet is planning to mention it.

Eric,

This just reprises everything that we discussed earlier today. I didn't realize you were the one tasked with this in Khanna's absence.

Thanks and let me know if anyone has any qs.

-Andrea-

To: McCabe, Janet[McCabe.Janet@epa.gov]
Cc: Copper, Carolyn[Copper.Carolyn@epa.gov]; El-Zoghbi, Christine[El-Zoghbi.Christine@epa.gov]; Hatfield, James[Hatfield.Jim@epa.gov]
From: Harvey, Patty
Sent: Mon 3/28/2016 2:06:18 PM
Subject: Acceptance of Proposal to Close Out Open Recommendations 3-1 and 3-3 of Office of Inspector General Report No. 04-P-00033, EPA and States Not Making Sufficient Progress in Reducing Ozone Precursor Emissions in Some Major Metropolitan Areas, September 29, [Document.pdf](#)

Please open the attached document. This document was digitally sent to you using an HP Digital Sending device.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 17 2016

THE INSPECTOR GENERAL

MEMORANDUM

SUBJECT: Acceptance of Proposal to Close Out Open Recommendations 3-1 and 3-3 of Office of Inspector General Report No. 04-P-00033, *EPA and States Not Making Sufficient Progress in Reducing Ozone Precursor Emissions in Some Major Metropolitan Areas*, September 29, 2004

FROM: Arthur A. Elkins Jr.

A handwritten signature in black ink, appearing to read "Arthur A. Elkins Jr.", written over the printed name.

TO: Janet McCabe, Acting Assistant Administrator
Office of Air and Radiation

We have reviewed your March 9, 2016, memorandum regarding open Recommendations 3-1 and 3-3 of the subject report. We accept the agency's proposal to close out these two remaining open recommendations based on the reasons outlined in your memorandum. No further response for this report is required. You may update the U.S. Environmental Protection Agency's Management Audit Tracking System to reflect completion of all required corrective actions.

If you or your staff have any questions, please contact Carolyn Copper, Assistant Inspector General for Program Evaluation, at (202) 566-0829 or copper.carolyn@epa.gov; or Jim Hatfield, Director, Air Evaluations, at (919) 541-1030 or hatfield.jim@epa.gov.

To: McCabe, Janet[McCabe.Janet@epa.gov]
Cc: Stewart, Lori[Stewart.Lori@epa.gov]
From: Cyran, Carissa
Sent: Fri 3/25/2016 7:19:09 PM
Subject: FOR REVIEW: Draft Regional Haze Guidance RLSO
[RH Guidance post it note 3-25-16.docx](#)
[RLSO- Draft Regional Haze Guidance Compares 2-25 Version with 3-25-Versi....docx](#)

Hi Janet,

Attached below for your review this weekend is the Draft Regional Haze Guidance. This version is a RLSO addressing your comments.

Thanks.

Carissa

To: Atkinson, Emily[Atkinson.Emily@epa.gov]; Stewart, Lori[Stewart.Lori@epa.gov]; McCabe, Janet[McCabe.Janet@epa.gov]
From: Dennis, Allison
Sent: Fri 3/25/2016 4:52:20 PM
Subject: FW: Speaking Invitation for AAPCA's 2016 Spring Meeting
AAA McCabe Invite 3-25-16.pdf

Well, here it is!

From: Clint Woods [mailto:cwoods@csg.org]
Sent: Friday, March 25, 2016 12:49 PM
To: McCabe, Janet <McCabe.Janet@epa.gov>
Cc: Dennis, Allison <Dennis.Allison@epa.gov>; Koerber, Mike <Koerber.Mike@epa.gov>
Subject: Speaking Invitation for AAPCA's 2016 Spring Meeting

Janet,

I hope all is well! I am writing to inquire about your potential availability to present at the Association of Air Pollution Control Agencies' 2016 Spring Meeting, to be held April 28 – 29 at the Columbia Marriott in Columbia, South Carolina. We are targeting a slot on the morning of Friday, April 29, but obviously we would welcome your participation throughout the meeting. The meeting is closed to the press and the program on April 29 is limited to EPA, state, and local agency personnel and their multi-jurisdictional organizations.

I have attached a formal invitation, but please let me know if you have any questions or if there is anything I can do to help facilitate this request. I know our members have very much appreciated your attendance and dialogue at our past Association events, and we look forward to seeing you in South Carolina.

Thanks so much for your consideration.

Clint Woods

Executive Director

Association of Air Pollution Control Agencies

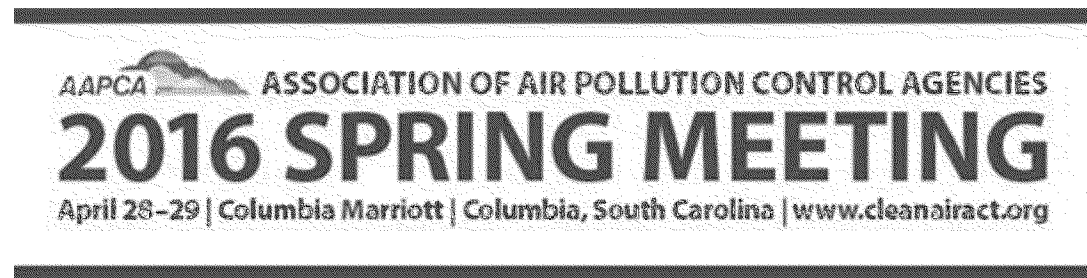
2760 Research Park Dr.

Lexington, KY 40511

859.244.8040 – office

cwoods@csg.org

<http://www.cleanairact.org>



March 25, 2016

Ms. Janet McCabe
Acting Assistant Administrator, Office of Air and Radiation (OAR)
U.S. Environmental Protection Agency (EPA)
William Jefferson Clinton Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Dear Ms. McCabe,

On behalf of the Association of Air Pollution Control Agencies (AAPCA), I would like to invite you to attend and speak at AAPCA's 2016 Spring Meeting in Columbia, South Carolina from April 28 - 29. As you may know, AAPCA is a consensus-driven organization representing state and local air agencies on technical Clean Air Act (CAA) issues. We are expecting robust member participation at the 2016 Spring Meeting and looking forward to holding the meeting in a location convenient for EPA and OAQPS staff to attend as well. More information on the meeting, which will be held at the Columbia Marriott, is available on AAPCA's website.

If you are available, AAPCA is interested in having you present on the morning of Friday, April 29, but we would welcome your participation throughout the meeting. The meeting is closed to the press and the program on April 29 is limited to EPA, state, and local agency personnel and their multi-jurisdictional organizations. We are happy to provide additional details on content and logistics. Our members have expressed an interest in discussing a few particular topics on April 29: SO₂ implementation; designations for the 2015 ozone NAAQS; transport issues; and balancing resource-intensive demands of traditional CAA responsibilities with legal uncertainties surrounding the Clean Power Plan.

We understand your schedule is very busy and we appreciate your consideration. I have included a link in my email to some of the other meeting logistics and hotel information, and am happy to answer any other questions you may have.

Our membership looks forward to working with you, and, if it works in your schedule, seeing you in Columbia in late April.

Sincerely,



Clinton J. Woods
Executive Director
AAPCA

To: McCabe, Janet[McCabe.Janet@epa.gov]
Cc: Dennis, Allison[Dennis.Allison@epa.gov]; Koerber, Mike[Koerber.Mike@epa.gov]
From: Clint Woods
Sent: Fri 3/25/2016 4:49:22 PM
Subject: Speaking Invitation for AAPCA's 2016 Spring Meeting
[AAA McCabe Invite 3-25-16.pdf](#)

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Clint Woods

Executive Director

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ASSOCIATION OF AIR POLLUTION CONTROL AGENCIES

2016 SPRING MEETING

April 28-29 | Columbia Marriott | Columbia, South Carolina | www.cleanairact.org

March 25, 2016

Ms. Janet McCabe
Acting Assistant Administrator, Office of Air and Radiation (OAR)
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Sincerely,



Clinton J. Woods
Executive Director
AAPCA

To: McCabe, Janet[McCabe.Janet@epa.gov]; Atkinson, Emily[Atkinson.Emily@epa.gov]; Loving, Shanita[Loving.Shanita@epa.gov]; Stewart, Lori[Stewart.Lori@epa.gov]
From: Niebling, William
Sent: Fri 3/18/2016 9:25:00 PM
Subject: FW: China Mission Trip Report
McCabe-Op-Ed FINAL V3.docx
McCabe OAR China Mission Trip Report.docx

Shanita – I have reviewed the attached documents and think they make for an accurate and complete trip report. Would you please submit it on my behalf?

Janet – I think this is good and comprehensive, so I propose that we submit it on your behalf as well.

Thanks,

Wm.

From: Schultz, Rebecca
Sent: Thursday, March 17, 2016 1:12 PM
To: Niebling, William <Niebling.William@epa.gov>
Cc: Evarts, Dale <Evarts.Dale@epa.gov>
Subject: China Mission Trip Report

Hi William,

Attached is a trip report, that along with the op-ed, can serve as the official trip report to be submitted via FIAT for both you and Janet. Let me know if you have any questions.

Best, Rebecca

Rebecca A. Schultz

Office of Air Quality Planning & Standards

Climate, International & Multimedia Group

schultz.rebecca@epa.gov

(+1) 919.541.5693

AAA McCabe Mission to (PRC) China Beijing, Nanjing, Shanghai

Sunday February 28—Beijing	
8 AM-12:30 PM	<p style="text-align: center;">Visit and Tour of Cookstove Factory and Villages</p> <p>Location: Lao Wan Stove Company & Distribution Center and villages north of Beijing</p> <p>Participants:</p> <ul style="list-style-type: none"> • Mr. Wang Fei, Director, Rural Energy and Environment Agency, Ministry of Agriculture (MOA) • Representative, Ministry of Science and Technology (MOST) • Prof. Liu, Beijing University of Chemical Technology • Wu Jichong, Seema Patel, Global Alliance for Clean Cookstoves • EPA delegation <p>Event details: The delegation visited a cookstove showroom and distribution center to see new coal and pellet stoves used for both cooking and heating. The host, Lao Wan Stove Company, is a partner of the Global Alliance for Clean Cookstoves. The delegation also visited homes in various villages north of the city to see rudimentary coal and biomass stoves used for both cooking and heating, as well as improved coal and biomass pellet stoves in use. The tour provided a sense of the important role stoves play in everyday life and the remarkable difference improved stoves can make in quality of life.</p>
Monday February 29—Beijing	
10 AM -12 PM	<p style="text-align: center;">Meeting with Ministry of Environmental Protection (MEP) Chief Engineer Zhao Yingmin</p> <p>Location: MEP</p> <p>Chinese participants:</p> <ul style="list-style-type: none"> • Zhao Yingmin, Chief Engineer MEP • Tu Ruihe, Deputy Director General (DDG) of Dept of International Cooperation • Xu Bizhou (confirm name), DDG Dept of General Affairs • Wang Jian, DDG Dept Pollution Prevention and Control • Wu Jiyu, DDG Dept of Environmental Monitoring • Ms. Cui Dandan, Oceanic Affairs, Dept of Int'l Cooperation (DIC) • Ms. He Xiaoying, Oceanic Affairs DIC <p>US participants:</p> <ul style="list-style-type: none"> • EPA: Janet McCabe, Jim Blubaugh, Jeremy Schreifels, Dale Evarts, William Niebling, Rebecca Schultz • Embassy (ESTH): Chris Kavanagh, Stefan Whitney • USTDA: Steven Winkates • DOS: Jennifer Haverkamp

AAA McCabe Mission to (PRC) China Beijing, Nanjing, Shanghai

	<p>Meeting details: AA McCabe and Chief Engineer Zhao discussed bilateral cooperation on a range of topics, including regional air quality, transportation, power sector, air permitting, data analytics and HFCs. A key message from both sides was that EPA-MEP cooperation on air quality has been longstanding, deep and productive, having led to strong working relationships and important lessons that have benefited both sides. EPA and DOS expressed appreciation for MEP's hard work and leadership in the HFC contact group, and for agreeing to conclude an HFC amendment in 2016 with the "Dubai Pathway", and offered continued bilateral support for moving the process forward. EPA extended invitations to the April 2016 vehicle conference in the Ann Arbor, MI, and to the air pollution monitoring conference in St Louis, MO, August 8-11, 2016. Both sides expressed a commitment to continuing to strengthen the relationship, including through exchange (e.g., Regional Air Quality Management Conference in 2016) and collaboration around issues of pollution source permitting and data analytics as outlined in the 2016 JCEC work plans, leaving details to be clarified at the working level.</p> <p>Specific followup:</p> <ul style="list-style-type: none"> • HFC's – Cooperation on phase down amendment negotiations • Permitting workshop and study tour (summer/fall) (OAQPS) • RAQM – Workshop aligned with Tsinghua event (fall?) (OAQPS) • Big Data – MEP forum (June) and study tour (October) – (OITA) • Invitation to monitoring conference (St Louis) (OAQPS)
1:30-3:30 PM	<p>Domestic Policy Dialogue on Clean Power Plan, hosted by the National Center for Climate Strategy and International Cooperation of China (NCSC) under NDRC</p> <p>Location: NCSC Offices</p> <p>Chinese participants:</p> <ul style="list-style-type: none"> • Moderator: Prof. DU Xiangwan, Academician, Chinese Academy of Engineering • Host/Organizer: Prof. ZOU Ji, Deputy Director General, NCSC • Prof. ZHOU Dadi, Vice Chairman, China Society of Energy Studies and former President, Energy Research Institute under NDRC • Prof. PAN Jiahua, President, Institute for Urban Development and Environment, Chinese Academy of Social Sciences • Prof. WANG Yi, President, Institute for Policies and Management of Science & Technology, Chinese Academy of Sciences, Congressman of National People's Congress • Prof. WANG Jinnan, Chief Engineer, Chinese Academy of Environmental Planning • Ms. LI Ma, representing Prof. WANG Zhixuan, Vice President,

AAA McCabe Mission to (PRC) China Beijing, Nanjing, Shanghai

	<p>Chinese Federation of Electric Power Corporates (organization translated as “CPC”)</p> <ul style="list-style-type: none"> • Prof. XU Huaqing, Deputy Director General, NCSC (focus MRV legal and policy issues) • Mr. SUN Zhen, Deputy Director General, Department of Climate Change, NDRC • Ms. LIU Yang, Program Officer, Department of Climate Change, NDRC • Mr. PEI Liang, Program Officer, Department of Climate Change, NDRC (Involved in Paris negotiation, English speaking, enthusiastic) • Mr. Teng Fei, Tsinghua University • Wang Wei, Department of Climate Change, NDRC (Strategy and Planning) <p>US participants:</p> <ul style="list-style-type: none"> • Janet McCabe, Dale Evarts, Jim Blubaugh, Jeremy Schreifels, William Niebling, Kong Chiu, Rebecca Schultz (EPA); • Helena Fu (DOE); • Conway Irwin, Stefan Whitney (US Embassy - Beijing) <p>Meeting details: AA McCabe delivered a 30 minute presentation, followed by Q&A, on the Clean Power Plan as part of a Domestic Policy Dialogue series under the bilateral Climate Change Working Group. AA McCabe expressed the interest of the US in reinvigorating the bilateral policy exchanges, particularly as opportunities for cross-sector and interagency engagement, noting representation from DOS and DOE. EPA fielded questions on the Supreme Court decision to stay the Clean Power Plan and offered reassurance that the US is continuing to work toward post-2020 climate goals. No specific followup.</p>
5:00 PM	<p>Meeting with Tsinghua University Professor and Dean of the Institute of Environmental Science and Engineering, Mr. Hao Jiming</p> <p>Location: Shuangqing Rd, Haidian District</p> <p>Chinese participants:</p> <ul style="list-style-type: none"> • Profs. Hao Jimin, Wang Shuxiao, Ye Wu <p>US participants:</p> <ul style="list-style-type: none"> • Janet McCabe, Dale Evarts, Jim Blubaugh, William Niebling, Rebecca Schultz, Jeremy Schreifels <p>Meeting details: Prof. Hao led a discussion of the progress that is being made through the longstanding and strong working relationship between EPA and China’s top technical university. The meeting provided an occasion to reaffirm this relationship and acknowledge the high value of the work EPA and</p>

AAA McCabe Mission to (PRC) China Beijing, Nanjing, Shanghai

	Tsinghua have done together over the years and are continuing today, including academic exchanges and joint development of decision-making tools like BenMAP and ABaCAS.
Tuesday March 1—Beijing	
9:30- 10:30AM	<p style="text-align: center;">Meeting with National Development Reform Commission</p> <p>Location: NDRC Offices</p> <p>Chinese participants:</p> <ul style="list-style-type: none"> • Mr. Sun Zhen, DDG of Strategy and Planning, CC Department • Ms. Yao Wei, Strategy and Planning <p>US participants:</p> <ul style="list-style-type: none"> • Janet McCabe, Dale Evarts, Jim Blubaugh, Jeremy Schreifels, William Niebling, Kong Chiu, Rebecca Schultz (EPA) • Wan Xiaolei, Steven Winkates (USTDA) • Whitney (US Embassy - Beijing) <p>Meeting details: AA McCabe and DDG Sun both expressed appreciation for U.S.-China joint leadership in international fora on climate. Discussion covered a number of topics for potential expanded or continued engagement between U.S. and China, including: CCUS, specifically enhanced oil recovery; inventory development; MRV; transparency; and carbon markets. DDG Sun agreed on the key practical value of cooperation on MRV, both in terms of bilateral activities and in efforts to support global capacity building post-Paris. Details were left to the CCWG working level for possible follow-up. Specific followup:</p> <ul style="list-style-type: none"> • Potential of interest in GHG data collection activities beyond current level of effort (OAP) • Contact State about topics for future Domestic Policy Dialogues
11:00- 12:00PM	<p style="text-align: center;">Meeting with Beijing Environmental Protection Bureau</p> <p>Location: Haidian District, 14 Chegongzhua</p> <p>Chinese participants:</p> <ul style="list-style-type: none"> • Ms. Li Xiaohua, Deputy Director BJ EPB • Ms. Ming Dengli, Division Chief, International Cooperation Division • Ms. Li Xiang, Deputy Director for Atmospheric Management Division • Mr. Zhang Dawei, Director, BJ EMC • Mr. Li Kunsheng, Director, Vehicle Emissions Management Division • Ms. Chen Qi, International Cooperation Division <p>US participants:</p> <ul style="list-style-type: none"> • Janet McCabe, Dale Evarts, Jim Blubaugh, Jeremy Schreifels, William Niebling, Rebecca Schultz (EPA) • Whitney (US Embassy - Beijing)

AAA McCabe Mission to (PRC) China Beijing, Nanjing, Shanghai

	<p>Meeting details: Mr. Zhang Dawei gave the delegation a presentation and tour of the monitoring center. Deputy Director Li welcomed the group, expressed gratitude for exchanges between BJ EPB and US EPA as well as states, specifically California through the MOU with CARB. She particularly emphasized the value of personnel exchanges. AA McCabe commended the team for their progress and initiative, offered general support and encouragement, particularly on the issue of regional cooperation to address sources affecting Beijing.</p> <p>Specific followup:</p> <ul style="list-style-type: none"> • Invitation to monitoring conference (St Louis) (OAQPS)
12:15 PM	<p style="text-align: center;">Lunch with Prof. Chang Jiwen, Vice Director, Development Research Center under China State Council</p> <p>Meeting details: Discussion over lunch covered prospects for civil litigation in environmental protection, reorganization of the local-central governance structure, career performance evaluation, among other timely topics related to Chinese environmental management challenges. No specific followup.</p>
4:00 PM	<p style="text-align: center;">International NGO Roundtable</p> <p>Location: Offices of the Energy Foundation in China</p> <p>NGO Participants:</p> <ul style="list-style-type: none"> • Clean Air Alliance of China, Ms. Wang Lisha • Clean Air Asia, Ms. FU lu, China Director • Natural Resource Defense Council, Alvin Lin, China Climate and Energy Policy Director • Regulatory Assistance Project, Rick Weston • Environmental Defense Fund, Zhang Jianyu, China Program Director • American Bar Association, Jay Monteverde, Interim Deputy Director • Lawrence Berkeley National Lab, Lynn Price, China Group • Smart Freight Center, Wang Boyong, China Country Director • iGDP, Ms. LI Ang • EFC Transport Program, Ms. Xin Yan, Ms. Xiyong Tok <p>US participants:</p> <ul style="list-style-type: none"> • Janet McCabe, Dale Evarts, Jim Blubaugh, Jeremy Schreifels, William Niebling, Rebecca Schultz (EPA) • Stefan Whitney (US Embassy - Beijing) <p>Meeting details: EPA offer encouragement and solicited perspectives from the participants on the challenges that China faces with enforcement, transparency, governance, and other areas vital to building strong programs to integrate air quality and climate change. Discussion highlighted challenges</p>

AAA McCabe Mission to (PRC) China Beijing, Nanjing, Shanghai

	associated with coordinated energy and air quality planning, local-central governance authorities, and environmental permitting. No followup.
6:30 PM – 7:30 PM	<p style="text-align: right;">Speech at Beijing American Center</p> <p>Location: Beijing American Center, Chaoyang District</p> <p>Audience:</p> <ul style="list-style-type: none"> • >100 members of the public, majority Chinese, under 25, students and young working professional <p>Event details: AA McCabe gave ~20 minute speech followed by energetic Q&A. Speech content held closely to an op-ed, translated and placed in local popular media source, huanqiu.com (see attachment).</p>
Wednesday March 2—Beijing/Nanjing	
Depart hotel 7:15 AM 9:00 AM- 11:30 AM	<p style="text-align: right;">Meeting and Tour of Cummins Factory</p> <p>Location: NW Beijing, Changping District</p> <p>Chinese participants</p> <ul style="list-style-type: none"> • Dr. Lixin Peng: Vice President, Cummins Inc.; Chief Technical Officer/Cummins China • Li Wan: Executive Director, Strategy and Corporate Affairs, Cummins (China) • Yun Hong: Senior Manager of Product Environmental Management, Cummins (China) • Stella Xu: Senior Manager, Government Affairs, Cummins (China) • Zhanghua Guan: General Manager, Beijing Foton Cummins Engine Co., Ltd. (BFCEC) • Des Conlon: Plant Manager, BFCEC • Jim Li: Secretary of Board, BFCEC • Frank Zhao: Manager of Regulatory Affairs, BFCEC <p>US Participants:</p> <ul style="list-style-type: none"> • AA McCabe, William Niebling, Jim Blubaugh (EPA) • Stefan Whitney (US Embassy - Beijing) <p>Meeting Details: Meeting and factory tour provided an opportunity for OAR to learn from Cummins' perspective regarding China's upcoming cleaner fuel implementation and China VI emission standards development. The group toured Cummins heavy-duty engine production facility. No followup</p>
2:00 PM	G3 Train to Nanjing
6:45 PM	<p style="text-align: center;">Dinner Hosted by Jiangsu Provincial Vice-Governor Madam Xu Jinrong and the Jiangsu Provincial EPB</p> <p>Location: Hilton Nanjing</p> <p>Chinese participants (including):</p> <ul style="list-style-type: none"> • Vice Governor Madam Xu Jinrong, Jiangsu Province • Director General, Jiangsu EPB, Mr. Chen Mengmeng • Deputy Director General, Jiangsu EPB, Mr. Chen Zhipeng

AAA McCabe Mission to (PRC) China Beijing, Nanjing, Shanghai

	<p>Director, Jiangsu International Environmental Development Center, Mr. Hua Fenglin</p> <ul style="list-style-type: none"> • Vice Director, Jiangsu International Environmental Development Center, Ms. Liu Ming • Ms. Tong Li, MEP, Dept. of Pollution Prevention and Control (sub for DDG Wang Jian) • Ms. Li Yang, MEP, Dept. of Pollution Prevention and Control <p>US participants:</p> <ul style="list-style-type: none"> • Janet McCabe, Dale Evarts, William Niebling, Rebecca Schultz, Richard Damberg (EPA) • U.S. Project team: RTI, RAP, STI • Wan Xiaolei, Steven Winkates (USTDA) • Charles Reynolds, Sophia Chen, Chen Xinrong (Shanghai Consulate) <p>Event details: Brief discussion between AA McCabe and Vice Governor Xu and press event followed by dinner to commemorate the USTDA-MEP-Jiangsu EPB project. No followup.</p>
Thursday March 3 Nanjing-Shanghai	
9:00 AM-11:45 AM	<p style="text-align: center;">Workshop - Technical Assistance for the China Air Quality Management Program in Jiangsu Province</p> <p>Location: Hilton Nanjing</p> <p>Chinese participants (including):</p> <ul style="list-style-type: none"> • Vice Governor Madam Xu Jinrong, Jiangsu Province • Director General, Jiangsu EPB, Mr. Chen Mengmeng • Deputy Director General, Jiangsu EPB, Mr. Chen Zhipeng • Director, Jiangsu International Environmental Development Center, Mr. Hua Fenglin • Vice Director, Jiangsu International Environmental Development Center, Ms. Liu Ming • Ms. Tong Li, MEP, Dept. of Pollution Prevention and Control (sub for DDG Wang Jian) • Ms. Li Yang, MEP, Dept. of Pollution Prevention and Control <p>US participants:</p> <ul style="list-style-type: none"> • Janet McCabe, Dale Evarts, William Niebling, Rebecca Schultz, Richard Damberg (EPA) • Project team: RTI, RAP, STI • Wan Xiaolei, Steven Winkates (USTDA) • Charles Reynolds, Sophia Chen, Chen Xinrong (Shanghai Consulate) <p>Workshop details: AA McCabe gave opening remarks at the final workshop of a joint project of the U.S. Trade and Development Agency (U.S. TDA), China Ministry of</p>

AAA McCabe Mission to (PRC) China Beijing, Nanjing, Shanghai

	<p>Environmental Protection (MEP), EPA/OAR and Jiangsu Provincial Environmental Protection Bureau (EPB). EPA commended the work being done to adapt lessons learned from the U.S. and international experience to help accelerate air quality improvements in Jiangsu province and the Yangtze River Delta region. EPA emphasized the important work and clear progress being made, offering support for their efforts to improve air quality and continue to stand ready to share from our experience, expertise, and tools.</p> <p>Specific followup:</p> <ul style="list-style-type: none"> • Discuss possible followup projects on air quality program implementation with US TDA and China partners
2:00 PM	<p style="text-align: center;">Roundtable with Students from Nanjing University</p> <p>Location: Nanjing University</p> <p>University participants:</p> <ul style="list-style-type: none"> • Prof. Bi Jun, Dean of the School of Environment, Nanjing University • Prof. Dai Zhehua, Director, Study Abroad Training and research Center, Nanjing University • Roger Raufer, Hopkins Nanjing Center • + ~20 students graduate and undergraduate levels <p>US participants:</p> <ul style="list-style-type: none"> • Janet McCabe, Dale Evarts, William Niebling, Rebecca Schultz, Richard Damberg (EPA) • Charles Reynolds, Sophia Chen (Shanghai Consulate) <p>Event details:</p> <p>This roundtable event provided an occasion for informal exchange with Chinese and American students from Nanjing University and the Johns Hopkins Nanjing Center. Discussion covered the Supreme Court Stay, U.S. actions to reduce climate pollution, the importance of U.S.-China cooperation on global environmental issues, as well as career perspectives and encouragement.</p>
4:28 PM	Train G129 to Shanghai
Friday March 4-Shanghai	
8:30 AM - 10:00 AM	<p style="text-align: center;">Business Roundtable on Air and Climate organized by the American Chamber of Commerce</p> <p>Location: Portman Ritz-Carlton Office Building, Shanghai</p> <p>Business community participants:</p> <ul style="list-style-type: none"> • Dan Sun, VP for Government and Public Relations at Honeywell • Peter Wong, Dow Chemical President (China) • Russell Scoular, Regional Director at Ford Motor Company • Gianluca Pettiti, President China at Thermo Fisher Scientific • Xiangli Chen, General Manager at General Electric • Tim Wang, Senior Vice President and General Manager at Ecolab

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	<p>Zhengmin Li, President (China) at Praxair</p> <ul style="list-style-type: none"> • Jun Zheng, Regional General Manager for East and Central China at IBM • Michael Rosenthal, AmCham Shanghai Environmental Committee Chair <p>USG participants:</p> <ul style="list-style-type: none"> • Janet McCabe, Dale Evarts, William Niebling (EPA) • Charles Reynolds, Sophia Chen (Shanghai Consulate) <p>Meeting details: OAR provided an update to U.S. businesses on its work in China and gathered insights and perspectives on the distinct environmental issues U.S. businesses face in China. AA McCabe emphasized EPA's partnership with Chinese governmental agencies to strengthen environmental institutions and laws, which can lead to more equitable enforcement and generate demand for innovative U.S. technologies. Participants shared their perspectives on the environmental issues they faced in doing business and operating plants in China. They indicated that respect for intellectual property rights has improved in recent years and that claims of fuel quality are often false.</p> <p>Specific followup:</p> <ul style="list-style-type: none"> • Send recommendation from EPA to China on increasing resources for MEP and EPBs
2:00 – 4:00 PM	<p style="text-align: center;">Meeting with Shanghai Environmental Protection Bureau and Shanghai Environmental Monitoring Center</p> <p>Location: People's Square, 100 Dagu Rd, Shanghai</p> <p>Chinese participants:</p> <ul style="list-style-type: none"> • Luo Hailin, Chief Engineer, Shanghai EPB • Wang Ziang, Chief for Regional Cooperation • Shi Min, Director, Air Office • Wei Huajun, International Cooperation Department <p>USG participants:</p> <ul style="list-style-type: none"> • Janet McCabe, Dale Evarts, William Niebling (EPA) • Charles Reynolds, Sophia Chen (Shanghai US Consulate) <p>Meeting details: This meeting offered an opportunity to discuss the fruits of the partnership on AirNow-International, and to learn about the metropolitan government's efforts to address air quality challenges. AA McCabe expressed appreciation of Shanghai EPB's leadership role and its innovative approaches to air quality management, acknowledging the productive partnership OAR has enjoyed with Shanghai in particular and also the greater Yangtze River Delta regional cooperation. Meeting also included a tour of the Environmental Monitoring Center.</p> <p>Specific followup:</p> <ul style="list-style-type: none"> • Invitation to monitoring conference (St Louis) (OAQPS)

**AAA McCabe Mission to (PRC) China
Beijing, Nanjing, Shanghai**

	Respond to proposal for technical collaboration and training on forecasting and ozone assessment/control using multipollutant approaches (OAQPS)
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To: Stewart, Lori[Stewart.Lori@epa.gov]; McCabe, Janet[McCabe.Janet@epa.gov]
From: Millett, John
Sent: Fri 3/18/2016 3:13:22 PM
Subject: RE: OAR Weekly Shout Out

This clip is quite timely – though, after reading it, I’d not be inclined to share it office wide on this occasion.

With ‘Smog Jog’ Through Beijing, Zuckerberg Stirs Debate on Air Pollution

<http://www.nytimes.com/2016/03/19/world/asia/mark-zuckerberg-jogging-beijing-smog.html?hp&action=click&pgtype=Homepage&clickSource=story-heading&module=second-column-region®ion=top-news&WT.nav=top-news>

HONG KONG — A morning run can be the perfect way to overcome jet lag, but usually not when it’s through the choking haze of auto exhaust and industrial discharge.

In a Friday morning post, [Facebook](#)’s co-founder and chief executive, [Mark Zuckerberg](#), announced his arrival in Beijing with a blithe message about what must have been a dizzying jog through the center of [China](#)’s capital, which has been suffering from a weeklong bout of hazardous air pollution.

“It’s great to be back in Beijing! I kicked off my visit with a run through Tiananmen Square, past the Forbidden City and over to the Temple of Heaven,” Mr. Zuckerberg [wrote on Facebook](#), likely using a virtual private network to get around the Chinese government Internet filters, which block his site.

In a photo accompanying the post, made about 10:30 a.m., Mr. Zuckerberg smiles alongside several running companions in front of the famous portrait of Mao Zedong that overlooks Tiananmen Square. At 9 a.m. an [air-quality monitor](#) at the United States Embassy in Beijing calculated the level of PM2.5, ultrafine particles that damage respiration, at 305 micrograms per cubic meter. That level is deemed “hazardous” under American air-quality standards.

The color of the sky was the sort of gray hue that indicates a bad pollution day. The faint smell of something burning hung in the air. Many children on buses, or scooting to school with their parents or nannies, wore face masks. In homes and offices, air purifiers were cranked up to the highest setting.

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The background for the photo of Mr. Zuckerberg's run, directly in front of the Forbidden City at the center of Beijing, is normally public-relations friendly. But by ignoring the air quality, Mr. Zuckerberg inadvertently stirred an online debate about China's major air pollution problems.

During the past two years, Mr. Zuckerberg has made several high-profile trips to China and has done little to stifle conjecture about his ambitions to bring Facebook to the country. During a visit by China's Internet czar, Lu Wei, to Facebook's campus in the United States in 2014, Mr. Zuckerberg showed off a copy of a collection of speeches and propaganda directives by the Chinese president, Xi Jinping.

Today's Headlines: Asia Edition

Get news and analysis from Asia and around the world delivered to your inbox every day in the Asian morning.

Mr. Zuckerberg has also been public with his personal project of learning Mandarin. In two recent trips to Beijing, Mr. Zuckerberg has spoken Chinese, the first time in an informal chat at China's Tsinghua University and the second time in a more formal speech about his plans for Facebook.

On Facebook, responses to Mr. Zuckerberg's run ran the gamut from mocking to genuinely concerned about his health.

One user, Christina Tan, sought to warn Mr. Zuckerberg: "Mark, don't u see the air pollution? Stop running outside! Beijing is my home, but I'm not recommending you run outside."

Although some noted he should have worn a face mask, others joked about his ability to access Facebook despite the Chinese government's cracking down on ways to get around the so-called Great Firewall, which keeps Chinese users cordoned off from the wider Internet.

Others simply took umbrage with where the photo was staged, at the heart of Tiananmen Square.

"The floor you stepped has been covered by blood from students who fought for democracy. But, enjoy your running in China, Mark. :)," wrote a user named Cao Yuzhou.

On Twitter, that sentiment was reflected in an image in which Mr. Zuckerberg had been photoshopped in place of the famous "tank man" in front of a line of tanks from the 1989 military crackdown on the student-led protests in Tiananmen Square.

Within China, news of Mr. Zuckerberg's run was quickly picked up by the tech media. On China's Weibo, the microblogging service, Chinese users were as sarcastic as those on Facebook.

One named Bpxue wrote, “He climbed over the Great Fire Wall to breathe in smog. He’s trying too hard!”

77Comments

Another wrote, “Shoot, he is running without a face mask, no wonder it’s called fei si bu ke,” a reference to a sarcastic nickname for Facebook in China that roughly translates to “must die” or “doomed.”

From: Stewart, Lori
Sent: Thursday, March 17, 2016 6:52 PM
To: McCabe, Janet <McCabe.Janet@epa.gov>
Cc: Millett, John <Millett.John@epa.gov>
Subject: OAR Weekly Shout Out

Janet, I added your photos and, for now left the others in. Dale Evarts added the captions. I know you may want to delete some of them but thought you’d like to make that choice.

As you may know, a couple of weeks ago I traveled to China to meet with national and local officials, academics, businesses, and civil society to discuss air quality. It was eye-opening, and a valuable reminder not to take for granted the great progress we have made on improving air quality in the United States. One morning in Beijing I woke up early and went for a walk – when the AQI was 293, which is code purple, or “very unhealthy”!

The scale of the air quality challenge China faces is hard to fathom without visiting. But thanks to OAR’s team of experts who have been working with China and with other countries on how to address air quality and climate challenges – in some cases for decades – I had a fascinating, busy, educational, and exhausting trip.

We started on a Sunday, visiting a cookstove and heating stove distribution facility where we saw stoves designed to run on coal, pellets, gas, and electricity. We then visited rural parts of the area around Beijing, where Chinese families welcomed us into their houses so we could see the devices they use to keep their homes warm and cook their food. In the United States, we may have dozens of these implements – from central air to fireplaces and towel warmers in the bathroom, or a stove and a toaster oven and a microwave and...you get the point. These Chinese village houses still had a few ways, but different – like the *kang*, which is a kitchen stove that vents the exhaust heat under an adjacent bed, heating the bed and room. They mainly burn coal or wood, and piles of fuel and the smell of smoke were everywhere.

The next three days in Beijing were filled with a battery of meetings. We sat down with our direct Chinese counterpart, the Ministry of Environmental Protection, and discussed a wide range of topics related to air quality – such as their effort to put in place permits for hundreds of thousands of emissions sources. We had a rich dialogue with officials from across the Chinese government on U.S. domestic climate actions, including the Clean Power Plan, and a meeting with professors at Tsinghua University who are among China's leaders studying air quality. We visited the headquarters of the Beijing Environmental Protection Bureau (Beijing has a population of more than 21 million people, so they have a lot to do!), met with representatives of Chinese civil society, discussed joint climate change efforts with the National Development and Reform Commission, toured the factory where (Indiana-based!) Cummins makes state of the art diesel engines – and I gave a speech to dozens of interested members of the public, including many Chinese students, at the American Center.

We then took the train south to Nanjing, a historic national capital that is now the capital of the 80 million-person province of Jiangsu. There, we held a capstone event on a project that the U.S. Trade and Development Agency and OAQPS have been working on for a couple of years, helping the Jiangsu authorities and stakeholders from across China understand how to create and implement a regional air quality plan.

We wrapped our trip in Shanghai, where we met with representatives from U.S. businesses operating in China to hear their view on the regulatory environment – and the actual environment! We also sat down with the Shanghai Environmental Protection Bureau (Shanghai is even bigger than Beijing, with more than 24 million residents) and toured their state of the art laboratory.

In all of these meetings, we were carrying the key message that air quality is a local, regional, national and global issue. This is a lesson that we had to learn in the United States, too, not all that long ago. Whether it is cleaner cookstoves for moms and dads and kids in a Chinese village, a cleaner bus or truck that drives on our city streets or highways, or cleaner power plants that supply our electricity, we are joined together to reduce local and global air pollutants such as PM2.5, ozone, mercury, and carbon in the fight for cleaner air and healthy communities.

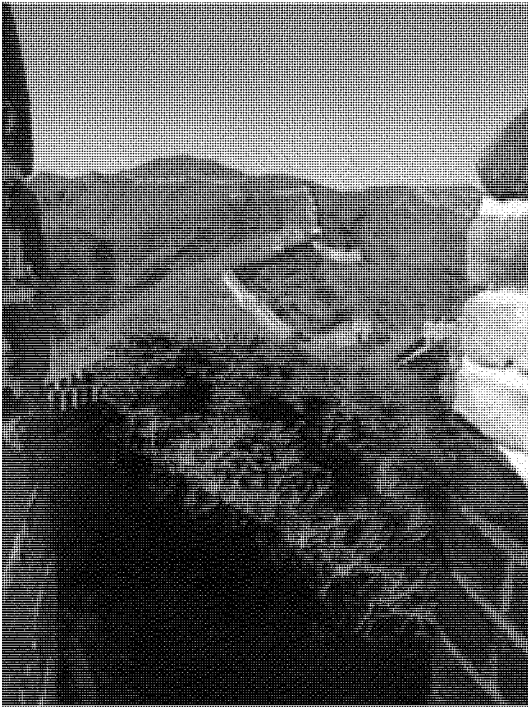
I have many people to thank for making this week so meaningful and productive. The OAR delegation in China included staff from OAQPS, OAP and the IO, with different people joining different meetings. At various points in time, I sat next to and relied on Jim Blubaugh, Kong Chiu, Rich Damberg, Dale Evarts, John Mitchell, William Niebling, Jeremy Schreifels, and Rebecca Schultz. They did a huge amount of work to make travel plans, set up meetings, write briefing memos and talking points, and develop key asks. But they weren't alone. Back in Washington and RTP, many others helped with all of those tasks: Emily Atkinson, Kristen Bremer, Cynthia Browne, Carissa Cyran, Allison Dennis, Marlene Jones, Mark Kasman, Shanita Loving, Kristal Mazingo, Josh Novikoff, Luis Troche, Scott Voorhees, and Steve Wolfson. And not to be left out, several hard-working State Department colleagues paved the way for us, kept us on time, and helped explain what we were seeing and hearing: Stefan Whitney, Charles Reynolds, Chen Xinrong.

Have a nice weekend everyone.

Janet



View of the Beijing skyline and haze
AQ day!)



Great Wall (on a good



Nanjing skyline from its historical wall





Air Quality monitors in Beijing

Beijing sunrise





Charcoal for stoves and boilers
kang

Kitchen stove, heating an adjacent



Traditional *kang* (warmed underneath)

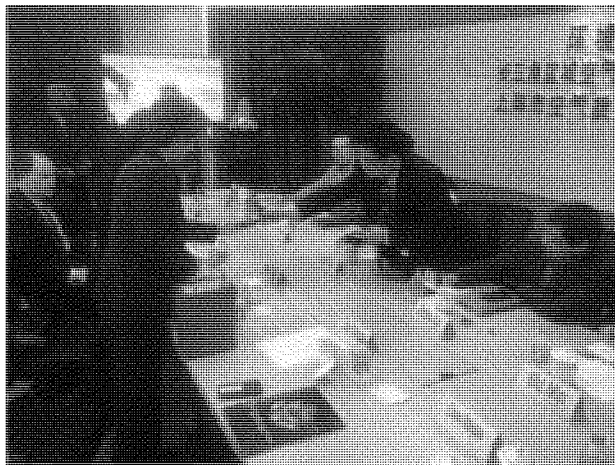


Beijing Environmental Protection Bureau
Officials
Environmental Monitoring Center

Tour of Beijing



Cummins diesel factory in Beijing
Shanghai environmental officials



Exchange of gifts with

To: Garbow, Avi[Garbow.Avi@epa.gov]; McCabe, Janet[McCabe.Janet@epa.gov]; Purchia, Liz[Purchia.Liz@epa.gov]; Distefano, Nichole[DiStefano.Nichole@epa.gov]; Fritz, Matthew[Fritz.Matthew@epa.gov]
Cc: Rennert, Kevin[Rennert.Kevin@epa.gov]
From: Vaught, Laura
Sent: Wed 3/16/2016 9:37:41 PM
Subject: BOEM Air Quality rule
[draft BOEM Air Quality release CLEAN COPY.docx](#)
[draft Q&As Air quality 3-8-16 \(1\).doc](#)

As a heads up, BOEM reached out to let us know that they're planning to roll out their proposed update to their OCS air quality regulations tomorrow afternoon. These regs are, in part, designed to make their actions consistent with EPA air quality regulations. I've attached their DRAFT comms materials, that can be expected to change as they continue to work them tonight – these are obviously embargoed, but to give us background. They reached out to EPA prior to sending their proposal over to OMB for our advice, and both OAR (Mike Koerber and Allen Fawcett's groups) and OP (NCEE) provided feedback prior to upload. EPA further commented through the formal OIRA process.

To: McCabe, Janet[McCabe.Janet@epa.gov]
Cc: Stewart, Lori[Stewart.Lori@epa.gov]
From: Shaw, Betsy
Sent: Mon 3/14/2016 10:51:47 PM
Subject: Feedback requested on draft ADD agenda
Indianapolis Spring 2016 ADD Mtg Draft Agenda 3-4-16.docx
ADD MTG MODERN TOOLS IN PERMITTING 3-14-16.rev.docx

Hi Janet,

Attached please find the draft agenda for the ADD meeting in May. I promised Eric and Carl to solicit your feedback.

My sense is that the topics look roughly right, except for the budget session at the end which I think is unnecessary. I'm not entirely clear what Debbie has in mind for the session on the first day entitled "Regional Collaboration on OAR Rulemakings" and will touch base with her about whether we can cover some rule effectiveness stuff in that session.

I will also be talking to Anna about the session on the second day entitled "Using Modern Tools in Permitting" (draft outline attached)." Her initial idea for this session was to call it "Making a Visible Difference in Communities through Permitting," which I think is a more compelling title and better orients the session toward desired outcomes. I would be inclined to give this session more time given the many sub-topics included so there's time for discussion.

Finally, I want to confirm what I've assumed was your plan to participate in both days of the ADD meeting.

Let's chat before I fly the coop COB Thursday if we can. (I plan to come back to our building after the EMC meeting ends midday).

Thanks,

Betsy

Draft Agenda
Spring 2016 Air Division Directors' Meeting
New Orleans, LA

Conference call-in number is: Conference Code code: Conference Code

**Note that although every attempt to maintain a working conference line will be made, the meeting is not being held at an EPA facility and conferencing capabilities in the meeting room may be limited to non-existent.*

Dates for the Meeting:

Wednesday, May 11th and Thursday, May 12th, 2016.

Location of the ADD Meeting:

Indiana State Library
315 W. Ohio Street
Indianapolis, IN 46204



ADD Meeting Information

- The spring ADD meeting will take place starting at 9:00 am on Wednesday, May 11th, and ending at 5:30 pm on Thursday, May 12th, at the Indiana State Library at 315 W. Ohio Street in the History Reference Room.
- The hotel room block for the ADD meeting is at the downtown Hilton Indianapolis, which is located at 120 W. Market Street and only a few blocks away from the Indiana State Library. Guests may book their rooms by calling the hotel at 1-800-774-1500 and referencing the special rate code for "USEPA" or by [clicking here](#). Note that the negotiated room block rate of \$139 is slightly above government per diem due to peak rates and you will need to claim actual subsistence on your TA. The room block cutoff date is April 10th. Your TA should include the following Conference/Project Code in the accounting portion of your TA for the ADD meeting: **ME2727AD**.
- Ground Transportation: IndyGo's Route 8 provides non-express, fixed-route service from the airport to downtown via stops along Washington Street (Cost is \$1.75 per ride). Go Express Travel (800-589-6004) offers shuttle service to and from the airport for \$10 each way. Alternatively, you may take a taxi cab (~\$35 one way) or Carey Indiana Limousine Service (~\$20.50 one way, call 800-888-4639).
- Presentations (when available), Meeting Materials, travel and logistics information can be accessed on the [OAR Lead Region SharePoint](#) (Click on ADD & APM Meeting Materials on left side of screen and find folder for Indianapolis – Spring ADD Meeting 2016).

NACAA Meeting Information

- The spring NACAA membership meeting will take place at the Drury Inn in Sante Fe, New Mexico the following week from May 16th – 18th. Registration and hotel information for the NACAA meeting can be accessed at the following link: http://www.4cleanair.org/Spring_2016. The hotel cutoff date is April 8th. If you are going to the NACAA meeting, you must also include the following conference code for your NACAA meeting trip: **ME272701**.

Wednesday, May 11, 2016

Time	Topic	Presenter	Desired Understanding/Outcomes
9:00 – 9:15	Welcome & Introductions	Eric Wortman (R8)	
9:15 – 9:45	Opening Discussion	Janet McCabe (OAR)	
9:45 – 10:45	Clean Power Plan	Carol Kemker (R4) Reid Harvey (OAP) Anna Wood (OAQPS)	
10:45 – 11:00	Break		
11:00 – 11:30	Regional Haze	Anna Wood (OAQPS) Region 9 or Region 2	
11:30 – 12:00	Air Toxics	OAQPS or OAPPS? Region 3	CAAAC Recommendations
12:00 – 1:15	Lunch – On Your Own		
1:15 – 1:45	Regional Collaboration on OAR Rulemakings	Debbie Jordan (R9)	
1:45 – 3:00	Reducing SIP Backlog & Improving SIP Processing among HQs and Regions	Anna Wood (OAQPS) Lorie Schmidt (OGC) Carl Daly (R8) Becky Weber (R8)	
3:00 – 3:15	Break		
3:15 – 4:15	Ozone	Anna Wood (OAQPS) Dave Conroy (R1) Reid Harvey (OAP) Chet Wayland (OAQPS)	<ul style="list-style-type: none"> Designations for 2015 NAAQS Background Ozone Ozone Implementation Rule Transport Exceptional Events (separate session if time becomes available and there is interest).
4:15 – 4:30	Wrap up and Adjourn (must exit building by 4:30)		
Dinner	Group Dinner: TBD		

Thursday, May 12, 2016

Time	Topic	Presenter	Desired Understanding/Outcomes
8:15 – 9:30	Regions Only		FY17-18 Subleads
9:30 – 9:45	Break		
9:45 – 11:00	SO2	Anna Wood (OAQPS) Chet Wayland (OAQPS) John Mooney (R5)	
11:00 – 12:00	Monitoring / Modeling	Chet Wayland (OAQPS) Carol Kemker (Region 4) John Mooney (Region 5)	<ul style="list-style-type: none"> Modeling Guidelines CAER – Combined Air Emissions Reporting Sensors Appendix W Near Road Monitoring Rule QA PAMs Funding
12:00 – 1:15	Lunch – On Your Own		
1:15 – 2:15	Using Modern Tools in Permitting	George Wyeth (OECA) OAQPS (Juan S.) Eileen Furey (R5) Betsy Shaw ???	<ul style="list-style-type: none"> E-Public Notice Next Gen Compliance and Permitting Title V Petitions e-reporting
2:15 – 3:15	Mobile Source	Mike Moltzen or Karl Simon (OTAQ) Rick Ruvo (R2)	<ul style="list-style-type: none"> Ports Retreat
3:15 – 3:30	Break		
3:30 – 4:15	ORIA	Mike Flynn (ORIA) Wren Stenger (R6)	<ul style="list-style-type: none"> Update on Rad Resources workgroup
4:15 – 5:00	Budget	Betsy Shaw (OAR)	<ul style="list-style-type: none"> FY16 Op Plan - \$17M for CPP, FTE Increases, \$21M Multipurpose Fund Revised STAG Allocation FY17 Pres Bud
5:00 -5:30	Wrap up and Adjourn		
Dinner	On Your Own		

To: Kelly Poole[kpoole@ecos.org]
From: Kelly Poole
Sent: Mon 3/14/2016 6:46:21 PM
Subject: "EJ Considerations in Permitting" Webinar PowerPoint Slides and Other Resources
[removed.txt](#)
[removed.txt](#)
[EJ-State-Guidance-updated-March-7.pdf](#)

Hi everyone,

Thank you for attending the "Environmental Justice Considerations in Permitting: Experiences, Approaches, and Challenges" webinar on Thursday, March 10th.

I have attached the slides and materials from the webinar along with the resources that were mentioned during the call. Presentations for last week's webinar were given by MN, SC, and NY.

I have also attached the presentations from the first EJ Considerations in Permitting webinar that was held November 12, 2015. Presentations for that webinar were given by MN, TN, MS, and CA.

Additionally, during the webinar, we mentioned the document titled "[Environmental Justice State Guidance](#)" that was put together by the [Environmental Justice Leadership Forum on Climate Change](#). I have also attached the document to this email, and if you have any questions regarding this document please contact Kerene Tayloe at kerene@weact.org.

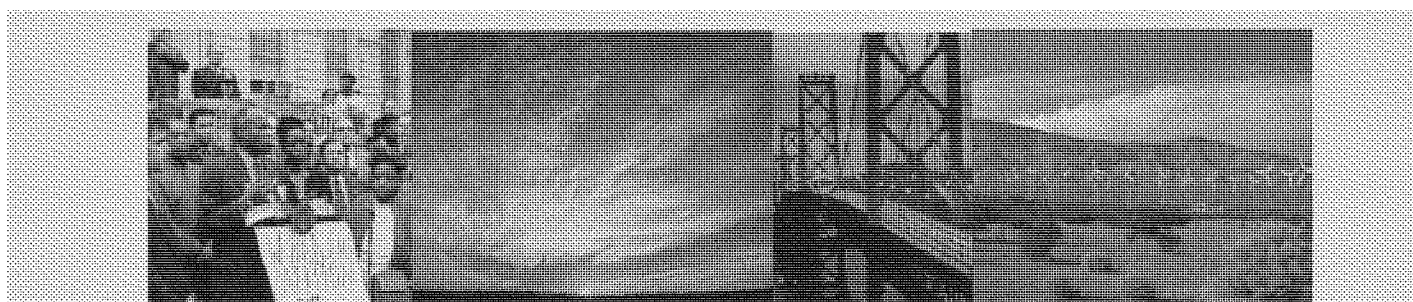
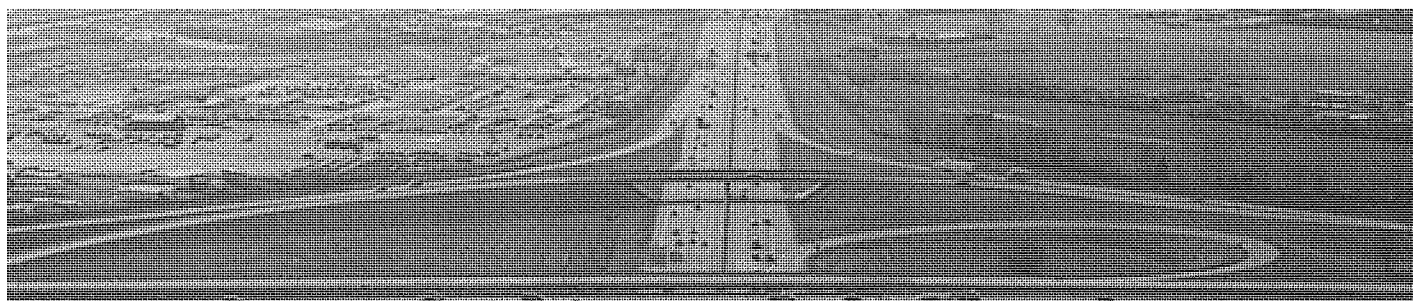
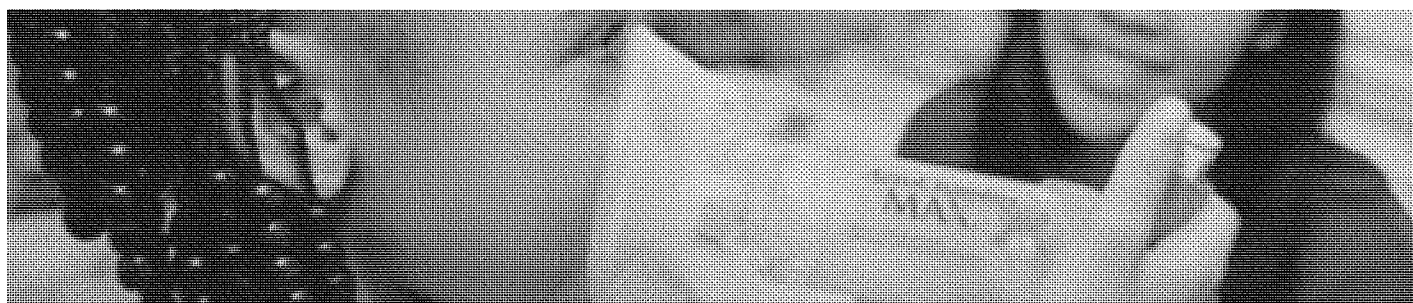
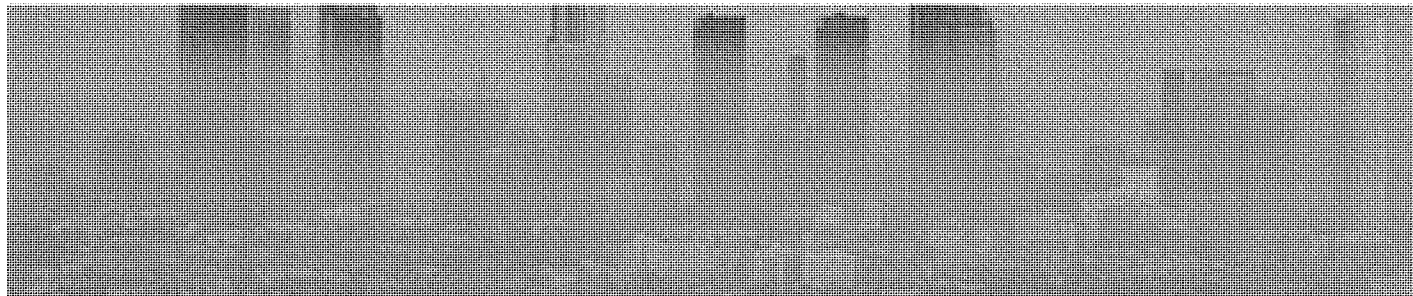
Please let me know if you have any questions, or if your state agency is interested in presenting on a future webinar.

Best,

Kelly Poole, JD
Project Manager
Environmental Council of the States
50 F Street NW, Suite 350
Washington, DC 20001
[202-266-4939](tel:202-266-4939)
kpoole@ecos.org

ENVIRONMENTAL JUSTICE GUIDANCE

HOW TO INCORPORATE EQUITY & JUSTICE INTO YOUR STATE CLEAN POWER PLANNING APPROACH



JANUARY 2016

This Guidance was created by the Environmental Justice Leadership Forum on Climate Change.

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- All footnotes will be denoted by the italicized bold numbers throughout the document.*

ENVIRONMENTAL JUSTICE STATE GUIDANCE?

HOW TO INCORPORATE EQUITY & JUSTICE INTO YOUR CLEAN POWER PLAN STATE PLANNING APPROACH

In the United States, there is a higher percentage of communities of color and low-income communities living near power plants. In fact, there are many power plants that are located near small rural communities with high percentages of low-income populations. In urban areas, nearby communities tend to be both low-income and communities of color. **The Environmental Protection Agency's Clean Power Plan** – released in August 2015 – requires states to reduce their emissions of carbon dioxide (CO₂) from fossil-fueled fired power plants. For the first time, the EPA is requiring state regulators to not only meet the new CO₂ emissions levels, but to also (1) demonstrate how they are meaningfully engaging all stakeholders - workers and low-income communities, communities of color, and indigenous populations, people living near power plants and otherwise potentially affected by the state's plan, (2) describe their engagement with their stakeholders, including their most vulnerable communities, and (3) evaluate the effects of their plans on vulnerable communities and take the steps necessary to ensure that all communities benefit from the implementation of this rule.

The purpose of this “Guidance” is to be a resource for state agencies and other stakeholders as they work to meaningfully engage with communities in the planning and implementation of this rule.

This guidance is not to be prescriptive, but to offer some definitions and context about Environmental Justice and how the concepts of equity, health and engagement are pivotal to the Clean Power Plan. However, we do offer the following key process and policy recommendations for all stakeholders – regulatory, community, and others – to consider as states move forward with their Clean Power Planning.

? Creating Opportunities for High Impact Engagement

It is important that key decision makers – from the state and community - are involved and visible in the conversation. EJ Stakeholders are fully represented and help drive the engagement process. Decisions are being made while considering all sides of the issue. The results of high-impact engagement should result in definitive environmental improvements and tangible results (i.e. reductions in emissions, and improvement in health) and the development of a more protective, stronger implementation of the Clean Power Plan and other regulatory constructs.

This guide will be useful to a diverse set of stakeholders? This guide has been created with input from Environmental Justice organizations and from diverse stakeholders and partners? The ideas presented are not to be prescriptive or comprehensive but are conversation starters for state regulators and community stakeholders? We encourage each state to reach out? solicit and listen first and foremost to specific concerns? ideas and requests of the most impacted communities in their state as to how they might proceed throughout the entire state planning process?

Key terms and definitions that will be used throughout this document are defined below. Use this as a reference not only for this document, but as you have conversations with various stakeholders.

Clean Power Plan (CPP): On August 3, 2015, President Obama and EPA announced the Clean Power Plan – a historic and important step in reducing carbon pollution from power plants that takes real action on climate change.

Co-pollutants: Gaseous pollutants that are emitted from a source in addition to the primary pollutant of concern. Co-pollutants are a significant concern to overburdened communities because the cumulative impacts (i.e. the additive effect of all pollutants in a community) are not considered when standards and emission limits are determined.

Disparate impacts : The U.S. Supreme Court recognized in *Texas Department of Community Affairs v. Inclusive Communities Project* (2015) that the prohibition of disparate impact discrimination, regardless of intent, is necessary to help move our country beyond a legacy of segregation and discrimination and toward opportunity for all. While the case was decided under the Fair Housing Act, the disparate impact standard under other laws is also critical for achieving Environmental Justice. Low-income communities and communities of color are more likely to be exposed to environmental contamination and pollution from industry sources, and lack environmental benefits, like parks and other green spaces.

There are five steps for determining disparate impact:

- (1) Identifying the affected population
- (2) Determining the demographics of the affected population
- (3) Determining the universe of facilities and total affected population
- (4) Conducting a disparate impact analysis; and
- (5) Determining the significance of the disparity

Electrical Generating Unit (EGUs): A generating unit consists of the sum and of all equipment necessary for production of electricity. In a coal-fired power plant, a generating unit would normally consist of one or more boilers where coal is burned to create steam, plus one or more turbine generators which convert the steam's heat energy into electricity.

Environmental Equality: Equality-driven goals for environmental policy, law, and regulations and the valid reliable delivery of such services.

Environmental Equity: Development, implementation, and enforcement of environmental policies and laws to ensure that no group or community is made to bear a disproportionate share of the harmful effects of pollution or environmental hazards because it lacks economic or political clout.

Environmental Justice (EJ) A social justice, grassroots movement that seeks to protect communities of color and low-income communities from being overburdened with pollution. Citizens of different races and classes experience disparate environmental quality, directly affecting their public health and quality of life. The movement uses policy advocacy, research, community capacity building and organizing to advance environmental justice. Environmental Justice refers to those cultural norms and values, rules, regulations, behaviors, policies, and decisions to support sustainable communities where people can interact with confidence that their environment is safe, nurturing, and productive. Environmental Justice is served when people realize their highest potential without experiencing the —isms.

Environmental Justice Movement The Environmental Justice movement was started by individuals, primarily people of color and Indigenous/Native groups, who sought to address the inequity of environmental protection in their communities. Grounded in the struggles of the 1960's Civil Rights Movement, this movement sounded the alarm about public health dangers for their families, their communities and themselves.

Environmental Self Determination ?The ability to dictate the fate and use of your environment, as it is your rightful home. ?

Executive Order 12896 (EO 12896) Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations - was issued by President William J. Clinton in 1994. Its purpose is to focus federal attention on the environmental and human health effects of federal actions on minority and low-income populations with the goal of achieving environmental protection for all communities.

Fair Treatment ² A concept affirming that no group of people should bear a disproportionate burden of environmental harms and risks, including those resulting from the negative environmental consequences of industrial, governmental and commercial operations or programs and policies. ²

Federal Implementation Plan (FIP): A federally implemented plan to achieve attainment of air quality standards and is used when a state is unable to develop an adequate plan.

Greenhouse Gases (GHG): Any gas that absorbs infrared radiation and traps heat in the atmosphere. In large, artificially-created quantities (produced by human activities), GHG emissions can remain in the atmosphere for thousands of years at a time, and are increasingly toxic to human health when inhaled over long periods of time. Greenhouse gases include, carbon dioxide, methane, nitrous oxide, ozone, chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride.

LI-COC - Low-income / Communities of color (See **Overburdened Communities** in adjacent column).

Meaningful Engagement Actions by which potentially affected populations have an appropriate opportunity to (1) participate in decisions that will affect their environment and/or health, (2) contribute concerns that will be considered and can influence the local or state regulatory agency's decision throughout the process, and (3) that the decision makers seek out and facilitate the involvement of those potentially affected.

Mitigation : A human intervention to reduce the human impact on Earth's climate system; it includes strategies to reduce greenhouse gas sources.

National Ambient Air Quality Standards (NAAQS) : National Ambient Air Quality Standards are identified by the Clean Air Act as standards that provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. EPA has set National Ambient Air Quality Standards for six principal pollutants, which are called "criteria" pollutants. These pollutants include : carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM), and sulfur dioxide (SO₂).

Overburdened Communities - Minority , low income, tribal and indigenous populations or communities in the United States that potentially experience disproportionate environmental harm and risks due to exposure or cumulative impacts or greater vulnerability to environmental hazards.

Particulate Matter (PM): Very small pieces of solid or liquid matter such as particles of soot, dust, fumes, mists or aerosols.

Resilience The capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment.

State Implementation Plan (SIP): A plan for each State which identifies how that state will attain and/or maintain the primary and secondary National Ambient Air Quality Standards (NAAQS) set forth in section 109 of the Clean Air Act ("the Act") and 40 Code of Federal Regulations 50.4 through 50.12 and which includes federally-enforceable requirements. Each State is required to have a SIP which contains control measures and strategies which demonstrate how each area will attain and maintain the NAAQS. These plans are developed through a public process, formally adopted by the State, and submitted by the Governor's designee to EPA. The Clean Air Act requires EPA to review to ensure each plan is consistent with the Clean Air Act.

Title VI of the Civil Rights Act of 1964: Title VI and its regulations guarantee equal access to publicly funded resources, and prohibit both intentional discrimination and unjustified discriminatory impacts, regardless of intent, on the basis of race, color, or national origin, by recipients of federal funding. Recipients of federal funding sign contracts to comply with Title VI as a condition of receiving federal funds. California and other states have similar laws prohibiting intentional and disparate impact discrimination. The City Project's policy report, *Using Civil Rights Tools to Address Health Disparities*, is a valuable resource to address environmental and health concerns and comply with environmental justice and civil rights laws and principles. ²

U.S. Environmental Protection Agency (EPA or sometimes USEPA): The United States Environmental Protection Agency is an agency of the U.S. Federal Government which was created for the purpose of protecting human health and the environment by writing and enforcing environmental regulations based on laws passed by Congress.

Vulnerability: The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed; its sensitivity; and its adaptive capacity.

The Principles of Environmental Justice(EJ Principles) and the Jemez Principles for democratic organizing are foundational documents that guide the work of many Environmental Justice organizations. The EJ Principles were developed and adopted at a convening in Washington D.C. in 1991, where over 1,000 grassroots people of color from all 50 states gathered to understand the environmental challenges being faced by low income populations and communities of color. The Jemez Principles were created to help facilitate collaboration among diverse stakeholders to ensure that people of color had a voice. Mutual respect among diverse stakeholders is integral to tackling controversial policy solutions.

WE, THE PEOPLE OF COLOR, gathered together at this multinational People of Color Environmental Leadership Summit, to begin to build a national and international movement of all peoples of color to fight the destruction and taking of our lands and communities, do hereby re-establish our spiritual interdependence to the sacredness of our Mother Earth?to respect and celebrate each of our cultures, languages and beliefs about the natural world and our roles in healing ourselves?to ensure environmental justice?to promote economic alternatives which would contribute to the development of environmentally safe livelihoods?and, to secure our political, economic and cultural liberation that has been denied for over 500 years of colonization and oppression, resulting in the poisoning of our communities and land and the genocide of our peoples, do affirm and adopt these Principles of Environmental Justice

- ?) **Environmental Justice affirms the sacredness of Mother Earth, ecological unity and the interdependence of all species, and the right to be free from ecological destruction.**
- ?) **Environmental Justice demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias.**
- ?) **Environmental Justice mandates the right to ethical, balanced and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things.**
- ?) **Environmental Justice calls for universal protection from nuclear testing, extraction, production and disposal of toxic/hazardous wastes and poisons and nuclear testing that threaten the fundamental right to clean air, land, water, and food.**

- 5) Environmental Justice affirms the fundamental right to political, economic, cultural and environmental self-determination of all peoples.
- 6) Environmental Justice demands the cessation of the production of all toxins, hazardous wastes, and radioactive materials, and that all past and current producers be held strictly accountable to the people for detoxification and the containment at the point of production.
- 7) Environmental Justice demands the right to participate as equal partners at every level of decision-making, including needs assessment, planning, implementation, enforcement and evaluation.
- 8) Environmental Justice affirms the right of all workers to a safe and healthy work environment without being forced to choose between an unsafe livelihood and unemployment. It also affirms the right of those who work at home to be free from environmental hazards.
- 9) Environmental Justice protects the right of victims of environmental injustice to receive full compensation and reparations for damages as well as quality health care.
- 10) Environmental Justice considers governmental acts of environmental injustice a violation of international law, the Universal Declaration On Human Rights, and the United Nations Convention on Genocide.
- 11) Environmental Justice must recognize a special legal and natural relationship of Native Peoples to the U.S. government through treaties, agreements, compacts, and covenants affirming sovereignty and self-determination.
- 12) Environmental Justice affirms the need for urban and rural ecological policies to clean up and rebuild our cities and rural areas in balance with nature, honoring the cultural integrity of all our communities, and provided fair access for all to the full range of resources.
- 13) Environmental Justice calls for the strict enforcement of principles of informed consent, and a halt to the testing of experimental reproductive and medical procedures and vaccinations on people of color.
- 14) Environmental Justice opposes the destructive operations of multi-national corporations.
- 15) Environmental Justice opposes military occupation, repression and exploitation of lands, peoples and cultures, and other life forms.
- 16) Environmental Justice calls for the education of present and future generations which emphasizes social and environmental issues, based on our experience and an appreciation of our diverse cultural perspectives.
- 17) Environmental Justice requires that we, as individuals, make personal and consumer choices to consume as little of Mother Earth's resources and to produce as little waste as possible; and make the conscious decision to challenge and re-prioritize our lifestyles to ensure the health of the natural world for present and future generations.

Jemez Principles for Democratic Organizing

On December 6-8, 1996, forty people of color and European-American representatives met in Jemez, New Mexico, for the “Working Group Meeting on Globalization and Trade.” The Jemez meeting was hosted by the Southwest Network for Environmental and Economic Justice with the intention of hammering out common understandings between participants from different cultures, political backgrounds, and organizations. The following “Jemez Principles” for democratic organizing were adopted by the participants.

#1 Be Inclusive

If we hope to achieve just societies that include all people in decision-making and assure that all people have an equitable share of the wealth and the work of this world, then we must work to build that kind of inclusiveness into our own movement in order to develop alternative policies and institutions to the treaties and policies under neoliberalism. This requires more than tokenism; it cannot be achieved without diversity at the planning table, in staffing, and in coordination. It may even delay achievement of other important goals. It will require discussion, hard work, patience, and advance planning. It may involve conflict, but through this conflict, we can learn better ways of working together. It's about building alternative institutions, movement building, and not compromising in order to be accepted into the anti-globalization club.

#2 Emphasis on Bottom-Up Organizing

To succeed, it is important to reach out to new constituencies and to reach within all levels of leadership and membership bases of the organizations that are already involved in our networks. We must be continually building and strengthening a base which provides our credibility, our strategies, mobilizations, leadership development, and the energy for the work we must do daily.

#3 Let People Speak for Themselves

We must be sure that relevant voices of people directly affected are heard. Ways must be provided for spokespersons to represent and be responsible to the affected constituencies. It is important for organizations to clarify their roles, who they represent, and to assure accountability within our structures.

#4 Work Together In Solidarity and Mutuality

Groups working on similar issues with compatible visions should consciously act in solidarity, mutuality and support each other's work. In the long run, a more significant step is to incorporate the goals and values of other groups with your own work, in order to build strong relationships. For instance, in the long run, it is more important that labor unions and community economic development projects include

#7 Build Just Relationships Among Ourselves

#7 Commitment to Self-Transformation

As we change societies, we must change from operating on the mode of individualism to community-centeredness. We must “walk our talk.” We must be the values that we say we’re struggling for and we must embody justice, peace, and community.

BENEFIT #1: PUBLIC HEALTH

The purpose of the Clean Power Plan is to protect human health and the environment by reducing carbon dioxide emissions from fossil fuel-fired power plants in the United States. The CPP is also encouraging states to shift more of their energy generation by expanding the use of natural gas through building and increasing the capacity of Natural Gas Combined Cycle (NGCC) plants. While we recognize the air emissions from NGCC are lower than the emissions from coal-fired power plants, they are a source of concern for communities. NGCC's have been shown to lead to more emissions of methane, and foster the expansion of hydraulic fracking that has been shown to contribute to public health concerns.

The pollutants from burning coal contribute to four of the five leading causes of death in the United States: heart disease, cancer, stroke, and chronic lower respiratory disease. Power plants are a major source of air toxins like sulfur dioxide and mercury. Once emitted, some pollutants can combine to form "secondary pollutants" such as ozone and particulate matter, which are added threats to public health. While CO₂ is considered to be a global pollutant, CO₂ emissions exacerbate the impacts of climate change at the local level, further endangering the health and welfare of communities less resilient to extreme weather.

Climate Impacts on Health

- African Americans continue to have higher rates of asthma than the national rates. About 1 in 9 (11%) non-Hispanic blacks of all ages and about 1 in 6 (17%) of non-Hispanic black children had asthma in 2009, the highest rate among racial/ethnic groups. [7]
- The greatest rise in asthma rates (almost a 50% increase) was among black children from 2001 through 2009. [7]
- Increased levels of ozone caused by climate change will exacerbate asthma attacks and other respiratory ailments that disproportionately harm African Americans, leading to increased hospitalizations. In 2013, approximately 75 million people lived in counties with air pollution levels higher than the health-based standards set by EPA. [7]
- Hispanic children continue to have higher rates of asthma than the national rates, and increased levels of ozone caused by climate change will exacerbate asthma attacks and other respiratory ailments. [7]

- According to the United States Department of Health and Human Services' Office of Minority Health, in 2012, nearly 2.15 million Hispanic Americans reported that they have asthma. Hispanics are 60% more likely to visit the hospital for asthma, compared to non-Hispanic whites. Puerto Rican children are almost three times as likely to have asthma, as compared to non-Hispanic Whites. Hispanic children are 40% more likely to die from asthma, as compared to non-Hispanic Whites. [1]

- Extreme heat events can impact outdoor laborers and can cause heat exhaustion and heat stroke, and exacerbate existing cardiovascular and respiratory disorders. Hispanics account for 42% of construction laborers and as much as 75% of farm workers in the United States. These outdoor workers, and the communities that depend on them, could be particularly vulnerable to the impacts of climate change. [2]

- There are not enough parks, especially for children of color, as President Barack Obama recognized when he dedicated the San Gabriel Mountains National Monument. Parks provide healthy places for people to engage in active recreation; improve neighborhoods; help cool the climate by reducing the carbon footprint and the urban heat island effect; clean the air, ground, and water; provide habitat protection; and generate economic benefits including local green jobs.

Existing health disparities and other inequities increase vulnerability of certain communities.

By ensuring that these communities' voices are heard, we can go beyond compliance and make public health a priority.

BENEFIT # 2: BUILDING RELATIONSHIPS WITH STATES

The Clean Power Plan provides a unique opportunity for silos among agencies, both at the federal and state level, and among external stakeholders to be broken down. In addition to improving public health, the best CPP process can encourage:

- Constructing a CPP implementation plan that is equitable and meets the needs and voices of communities that are most impacted by air pollution and climate change
- Enhancing and complimenting current air quality strategies to achieve more co-benefits beyond compliance

Building trust and relationships between state regulators and impacted communities, beyond this document is important

- Developing a common set of working principles and engagement practices that can be used in **meaningful engagement** for the CPP and beyond.

Meaningful and continuous engagement with communities mean **more than just one public meeting or hearing**. Building the capacity of the community to be **engaged in the conversations** is critical as well. For communities to be “in the conversation”, they need, at the least:

An understanding of key components of the Clean Power Plan

- State planning process
- State Implementation timeline
- Key state contacts, roles and responsibilities
- Critical Partner Agencies
- Understanding the projected impact of the CPP
- Specific points where the community can engage throughout the process.

An understanding of the current air and energy landscape

- Profile of the Energy suppliers and distributors
- Major public health concerns
- Approved utility plans of future and existing power plants
- Current state and local policies that promote energy efficiency and renewable energy
- The level of outreach and engagement from industry to community
- How far the state is from achieving compliance
- Existence of current environmental laws that compliment the CPP

An understanding of the potential positive and negative impacts of compliance pathways

- See section: *Clean Power Plan Issues of Great Concern to Environmental Justice Communities*

In order to gain these understandings, it is **critical that technical resource assistance is available to the entire group of public participants**. Without additional support, it is difficult for most low income, communities of color to meaningfully participate the entire policy making process. Consequently, states should consider providing support by:

- Funding an analysis to answer specific questions about the impacts of the different compliance strategies on LI-COC (low-income / communities of color)
- Hosting community trainings and convenings throughout the entire planning and implementation process
- Creation of methodologies to determine overburdened areas and how resources might be deployed

BEFORE YOU BEGIN ENGAGEMENT

While the outcomes of meaningful engagement can be extremely revitalizing, meaningful engagement requires some preparatory work. For example, in the environmental regulatory world, **scoping** can be defined as an early, interactive process of determining key issues that can impact a decision-making process. [?]

Scoping is typically a part of the National Environmental Policy Act (NEPA) process for federal agencies that are proposing environmental federal actions. As a part of the National Environmental Policy Act (NEPA) requirements, federal agencies might have to prepare an Environmental Impact Statement (EIS) if a proposed major federal action is determined to significantly affect the quality of the human environment. Some of the elements of the **scoping process** that are involved in an EIS could also be used to enhance **meaningful engagement** in the CPP process

- Identifying the main stakeholders concerns and values of the affected community
- Understanding the concerns and values of the impacted communities
- Informing and keeping the public engaged throughout the entire process
- Identifying and providing information on existing pollution sources, acknowledging data gaps or any constraints on the process

The Scoping process is not a discrete event or activity. Scoping can also be used at the beginning and the end of the process to define reasonable alternatives

WHAT IS IMPACTFUL ENGAGEMENT ?

There are many ways that states can choose to meet the required engagement written in to the final Clean Power Plan. It is our hope that with the ideas and examples provided, states will consider more 'high impact' efforts, rather than 'low impact' efforts.

High Impact Key decision makers are involved and visible in the conversation and EJ Stakeholders are represented and help drive the engagement process. Decisions are being made while

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Questions to Ask When Scoping a Community

Scoping should be the first step in the engagement process. Scoping, accompanied by a preliminary EJ screening, (See *Section Environmental Protection Agency Tools*) to Support EJ Analysis allows you to answer some key questions:

- What areas in the state have a disproportionate number (i.e. more than average) of polluting industries?
- What communities in the state have consistently bad air quality?
- Are there any communities that are experiencing more negative health outcomes than others?
- Are these areas considered low income, or majority communities of color?
- Are there weekly/monthly community meetings that are open to the public?
- Are there people to talk to – trusted community members and leaders – that could share some of the needs and concerns of the community?
- Are there weekly, monthly community meetings that are open to the public that I should attend?

All of these and many more are questions that can be answered during the scoping process.

considering all sides of the issue.

Environmental improvements and tangible results (i.e. reductions in emissions, and improvement in health) are evident and new relationships and trust is being formed between state regulators and community stakeholders. Educational opportunities are available for impacted communities to understand the state planning, implementation and evaluation process.

Meetings should be conducted in the impacted community to educate, gather ideas and identify needs for engagement. Community leaders should be empowered to create the space and agenda.

Low Impact? Unsatisfactory efforts for outreach to community stakeholders are one-way conversations and dialogues. While compliance is achieved, it is at the expense of the community. Standard public hearing are required but does not facilitate a conversation or any learning with the community context. Sporadic webinars for education purposeful can sometimes leave communities more confused.

Ultimately, The consequences of low impact engagement could be:

- Policies that unintentionally have a negative impact on communities
- Feelings of exclusion by community members
- High probability of community resentment
- Health disparities are exacerbated

EXAMPLE OF HIGH IMPACT ENGAGEMENT

When community organizations can come together with state agencies, it will encourage an implementation process that incorporates a vast diversity of needs and perspectives. The South Carolina Department of Health and Environmental Control, in collaboration with several state agencies and community members has laid-out a strategy for meaningful engagement, led by

Environmental Justice advocates. Kingdom Living Temple Church in Florence, South Carolina is leading the way by organizing a statewide network called COREE (Communities Organized for Renewables and Energy Efficiency) to educate communities about equitable opportunities in partnership with WE ACT for Environmental Justice and the Environmental Justice Leadership Forum on Climate Change.

Having diverse partners all seated at the table to make decisions is the best approach. The South Carolina Department of Health and Environmental Control, South Carolina State Energy Coalition, Kingdom Living Temple, Communities Organized for Renewables and Energy Efficiency (COREE) and been engaged since early 2015 to work for the a strong implementation for the Clean Power Plan.



David White, left, an organic farmer, chats with Rev. Leo Woodberry on Nov. 12 at Francis Marion University after a forum discussing the future of South Carolina's energy plan. Photo Credit: Joe Perry of the Morning News

Specifically, a regional advisory committee was organized to coordinate four public regional meeting to be held three times from 2015 to 2016. Empowered community members are conducting an educational campaign with Solarize SC on the benefits of solar energy generation.

The State has organized an EJ Analysis Workgroup to develop a framework to understand the impacts of particular compliance decisions on overburdened communities.

- The state has also provided technical experts and consultants to support the community process and learning. This is particularly helpful when drafting responses during the public comment period.
- Encouraged state plan writers to provide updates to the community on the progress as well as give feedback on why certain decisions were made.
- Organize a forum/gathering to provide an overview of state/local opportunities to assist with key topics like: job transition, energy efficiency/weatherization, job training, solar and wind energy, energy costs.
- Form a Standing EJ Advisory Committee to work on CPP and future regulations.
- Develop metrics to track progress on air quality, health, jobs. Review these metric at various intervals throughout the entire process.

STAKEHOLDER INITIATED ENGAGEMENT

While there are some states that are continuing to determine what their engagement strategy will be, there are community and environmental justice stakeholders that are pushing for enhanced engagement and influencing the federal and state planning process.

Many groups have created webinars, tool kits, organized legislative hearings, and have worked to find alignment between existing community concerns and CPP topics.

VIRGINIA EJ COALITION

The Virginia Department of Environmental Quality has held a series of informal listening sessions to gather general input from the public to help inform the Commonwealth's review and implementation of EPA's final rules for existing power plant. Six public listening sessions were held across the state, as well as written comments were accepted from August 13 – October 13, 2015. DEQ has also assembled a diverse stakeholder group –composed of industry, energy efficiency, non-governmental organizations, and an Environmental Justice representative - to help develop recommendations for the Governors office around the CPP.

LITTLE VILLAGE ENVIRONMENTAL JUSTICE ORGANIZATION (LVEJO) CHICAGO, IL

LVEJO convened the meetings for the Chicago Environmental Justice Network (CEJN) during 3rd and 4th quarter of 2015. The purposes of these meetings were to bring Environmental Justice Stakeholders together to discuss the details of Illinois State Implementation Plan , related legislation, and identify opportunities to strengthen EJ provisions in the SIP.

ENVIRONMENTAL JUSTICE ANALYSIS

Understanding the environmental landscape is important before implementing any policy solutions. The ‘landscape’ not only includes current policies that are being implemented at the local and state level, but also areas, neighborhoods, and regions that have multiple environmental concerns – ranging from air pollution, toxic waste sites, or the prevalence of chronic diseases linked to pollution. An important strategy that the final Clean Power Plan encourages states to consider is conducting an environmental justice analysis. The rule states specifically,

The EPA encourages states to conduct their own analyses of community considerations when developing their plans. Each state is uniquely knowledgeable about its own communities and well-positioned to consider the possible impacts of plans on vulnerable communities within its state. Conducting state-specific analyses would not only help states assess possible impacts of plan options, but it would also enhance a state’s understanding of the means to engage these communities that would most effectively reach them and lead to valuable exchanges of information and concerns. A state analysis, together with the proximity analysis conducted by the EPA, would provide a solid foundation for engagement between a state and its communities. 16

The purpose of an **EJ Analysis** is to study how the development, implementation, and enforcement of environmental laws, regulations and policies will impact – positively or negatively – low income, communities of color, Native American and Indigenous Peoples. An **EJ Analysis** can help states and communities better understand where multiple negative and positive environmental impacts exist, and areas of opportunity.

Using an **EJ Analysis** will help with the scoping process, and ensure that EJ communities are identified early on and will potentially benefit from the CPP. An EJ Analysis can:

- Provide governmental agencies and other entities a systematic method of assessing data and policy decisions
- Provide standards to measure progress and equity and hold leadership accountable
- Give communities an additional tool for advocacy

Simple Steps for EJ Analysis

Step 1: Identifying vulnerable and/or overburdened communities

Step 2: Evaluating the potential impact of compliance options

Step 3: Understanding the baseline, collecting feedback & frequent evaluation

Here are some sample EJ Analyses that can be used to guide your work.

- Sample EJ Analysis for the State of Mississippi
http://www.ejleadershipforum.org/wp-content/uploads/2015/07/mississippi_mock-up.pdf
- Sierra Club's Comments on the CPP
<http://www.ejleadershipforum.org/wp-content/uploads/2015/07/Sierra-Club-Environmental-Law-Program-on-behalf-of-Sierra-Club-and-Earthjustice.pdf>

EPA's PROXIMITY ANALYSIS

One of the major requests from EJ Stakeholders during the Clean Power Plan rule finalization was for the EPA to conduct an EJ Analysis. The Agency conducted a **proximity analysis** for the final rulemaking that summarizes demographic data on the communities located near polluting power plants. The screening report used data from 2008-2012 Census and other key databases to understand the construct of communities within a 3-mile radius of power plants, collecting data on factors such as percentage of areas of minority population, those who qualify as low-income, the percentage of children and elderly in an area, and several other indicators. Again, this proximity analysis can be a useful starting tool for states.

Most importantly, the EPA's analysis underscores the need for separate, state EJ analysis' to occur. The findings show:

- **A higher percentage of communities of color and low-income communities are living near power plants than the national average**
- **There are many rural power plants that are located near small communities with high percentages of low-income populations**
- **In urban areas, nearby communities tend to be both low-income communities and communities of color**

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Every state has its own unique story to tell. Pulling data sets together, to better understand the environmental baseline, is critical before writing and implementing any state plan for CPP and other regulations and policies that come down the line.

On the Ground Expertise

To compliment EJ Screen and other data sources, community stakeholders should be a part of the data collection process.

Community stakeholders – who offer on-the-ground knowledge and expertise, should be involved. Often, there are factors and concerns that the data might not illuminate, or pertinent information that is more qualitative than quantitative. This is where having meaningful engagement with a diverse set of stakeholders, who can help add value and guidance to the process, is critical.



CLEAN POWER PLAN ISSUES OF GREAT CONCERN TO ENVIRONMENTAL JUSTICE COMMUNITIES

The final Clean Power Plan provides states the option to employ 3 distinct building blocks to achieve reductions of CO₂, as well as the opportunity to earn credit or allowances to achieve compliance through carbon trading programs, and the clean energy incentive program, or CEIP. While both carbon trading and the CEIP are well-intentioned, there are specific concerns that should be taken into consideration.

Carbon Trading Allows Power Plants to Avoid On-Site Pollution Reductions.

Carbon trading programs, which the Clean Power Plan allows states to include in their state plans, allow power plants to deny nearby communities important health benefits, or in the worst case scenario, increase emissions.

Where carbon reductions actually occur matters: power plants emit co-pollutants, so when a power plant relies on trading, then nearby communities do not enjoy ozone, particulate matter, and air toxics reductions.

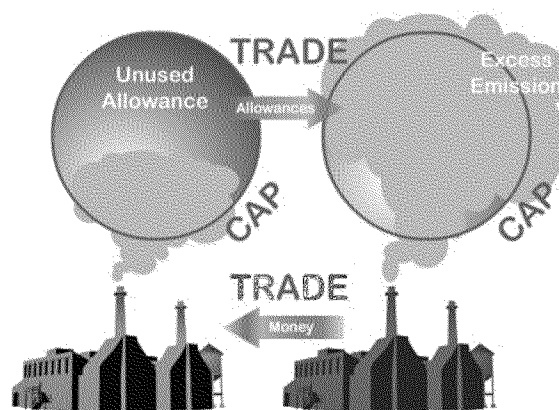
18

The EJ leadership Forum does not support pollution trading, and encourages states to promote equity and justice by requiring on-site reductions rather than pollution trading. States may even combine on-site reduction policies with a carbon tax to place a firm price on carbon, encourage additional reductions above and beyond mandatory regulations, and provide funding for climate resiliency.

We suggest states:

- Concentrate on source reductions – i.e. the “cap” without the trading
- Consider a carbon tax. There are several studies and a current piece of federal legislation (Climate Protection and Justice Act) that could be a useful model for states to consider. **19**
- Work directly with EPA to assess whether and where emission increases may result from plan implementation and mitigate adverse impacts, if any, in overburdened communities. Even though there has been no quantitative assessment of data to prove or disprove increased emissions in certain communities as a result of cap and trade, states must ask these questions “up front” in the planning process.
- Create a monitoring system to document baseline levels of carbon dioxide emissions and toxic co-pollutants, specifically in neighborhoods with multiple regulated sources, Title V or other major and minor permitted sources, or areas that are identified in the highest percentile from the EPA EJ Proximity Analysis.
- Work directly with EPA to determine whether the implementation of the federal plans and other air quality rules are, in fact, reducing emissions and improving air quality in all areas and, or whether there are localized air quality impacts that need to be addressed under other Clean Air Act authorities.
- Any type of trading, allowances or credits should be prohibited from being exchanged in any areas where the air is already compromised.

- Federally enforceable provisions must be in state plans to ensure monitoring, reporting, and enforcement in all communities for all compliance strategies, including cap and trade, and
- Provisions that ensure no disparate impacts from trading that comply with states' obligations under Title VI of the Civil Rights Act.



The Climate Protection and Justice Act

In December 2014 the *Climate Protection and Justice Act* was introduced with the goal of reducing total carbon emissions 80% below 1990 levels by 2050. The Act has the following elements that could be considered as a pathway to reduce carbon and increase the state's financial capacity to build more resilient communities and enhance energy efficiency for low income households.

- **Carbon Pollution Fee:** Establishes an upstream carbon pollution fee for coal, petroleum, and natural gas, produced in or imported into the United States, based on the amount of carbon dioxide that would be released upon the combustion of that particular fossil fuel.

- **Carbon Fee Rebate Program:** Proceeds from the carbon pollution fee are rebated equally to all eligible U.S. residents, with the exception of those individuals who are members of high-income households.

o Who receives proceeds? States can decide on Environmental Justice Census Areas called "Climate Adaptation Hotspot Communities". These communities could be identified based on geographic proximity, socioeconomic, public health, and environmental hazard criteria, including:

- Areas disproportionately affected by climate impacts, environmental pollution and other hazards that can lead to negative public health effects or environmental degradation.
- Areas with concentrations of people that are of low income, have high unemployment rates, low levels of homeownership, high rent burden, sensitive populations, or low levels of educational attainment.

Eligible entities then submit a five-year plan prioritizing climate justice-based resiliency projects prioritized by the study findings.

to reduce the burden of any increases to consumer bills that are predicted, as to maintain affordable electricity to low income consumers



A black and white photograph showing a group of people, likely immigrants, in an outdoor setting. In the foreground, a woman is seen from the back, holding a large white sign with the text "I WANT TO WORK" in bold, black, capital letters. She is wearing a dark jacket. To her right, a man in a light-colored shirt and dark tie is looking towards the camera. Other people are visible in the background, some looking at the camera and others looking away. The scene appears to be a public demonstration or protest.

Yet despite the region's persistent and immediate economic distress, the coal industry has all but drowned out consideration of economic and energy alternatives by investing heavily in a polarized and hostile political climate.

In the absence of elected leadership on these issues, grassroots efforts led by organizations like Kentuckians For The Commonwealth (KFTC) and the Mountain Association for Community Economic Development (MACED) have worked to promote a conversation about a just transition in the region.

In April 2013, KFTC hosted Appalachia's Bright Future, a 3-day conference attended by over 200 people in Harlan County, KY, the epicenter job losses in the coal industry. The event explored strategies and lessons from Appalachian communities and other places that have experienced economic disruption and transition. Panelists included a member of parliament from Wales, a fisherman from Newfoundland, a tobacco farmer from Kentucky, an indigenous community leader from the Black Mesa Reservation, a forester from the Pacific Northwest, an organic farmer from Southwestern Virginia, and founder of a community foundation in eastern Kentucky, and a displaced coal worker.

Today the results of those and other grassroots efforts can be seen in ways large and small. In late 2013 Republican Congressman Hal Rogers (KY-5) and former Democratic Governor Steve Beshear announced a bi-partisan initiative called Shaping our Appalachian Region (SOAR) focused on building a more diverse and prosperous economy

In 2015, President Obama proposed a package of investments worth more than \$1 billion aimed at supporting worker training, transitions for displaced miners, shoring up mine worker pensions and health plans, creating jobs, and reclaiming abandoned mining lands. People throughout the region – led in many cases by young people - are striving to create vibrant local economies through worker cooperatives, food and fiber production, local music and food, clean energy projects, and more.

None of these efforts are sufficient. But together, they represent important steps toward a just transition where affected workers, unions, communities and government are partners in improving the quality of life for people and places most affected by our shift from fossil fuels to cleaner sources of energy.

Principles of a Just Transition

- **Improve the quality of life for people and communities affected by economic disruption, environmental damage, and inequality.**
- **Foster inclusion, participation and collaboration.**
- **Generate good, stable, meaningful jobs and broad access to opportunities and benefits.**
- **Promote innovation, self-reliance and broadly held local wealth.**
- **Protect and restore public health and our environment.**
- **Respect the past while also strengthening communities and culture.**
- **Consider the effects of decisions on future generations.**

This document is not meant to be prescriptive but to only offer starter questions in some substantive areas that seek to engage with vulnerable and overburdened communities.

- How can we layout a planning process early so community members are aware of the specific points of engagement?
- How can we facilitate communication with external stakeholders throughout the process using monthly check-in calls, meetings, webinars, a regulation hotline etc.?
- How often should we provide feedback on the process to stakeholders – monthly, quarterly basis?
- Have we properly scoped out areas vulnerable to climate change impacts and overly burdened communities in our state?
- Has the SIP planning team formed a community advisory board to work with throughout the planning process?
- Have you conducted intentional outreach to all groups that need to be a part of the public hearing process?
- Are there communities of concern identified in EJ Screen and EPAs proximity analysis that should be looked at more closely?
- Is there a ‘checks and balance’ process to assess how funds/revenues will be used in the Clean Energy Incentive Program, or other revenue generating programs to support building out an infrastructure to support climate resilient planning efforts in local communities?

- Has baseline health data – specifically for respiratory diseases, cancers, etc. - been collected for impacted communities to understand the current state of health?
- Can we collect data to prove or disprove impacts?
- Using the experiences of current trading programs, what are the backstops that need to be put in place to ensure that certain areas do not see increased criteria pollutant? Emissions in overly burdened communities (i.e. “hot spots”)?
- Is there a system in place to ensure that emissions reductions are happening? Are there CO₂ monitors in place already, or do the current monitoring systems need to be expanded to quantify CO₂ and CO₂ co-pollutant reductions?
- Will the current classification of how waste is burned for energy cause an increase in harmful emissions? Or is there an opportunity to put in place Sustainable Materials Management practices that look to create closed loop industrial and chemical manufacturing processes and significantly reduce the amount of waste needing to be burned or landfilled?

JOBS AND ECONOMIC DEVELOPMENT

- Will you create incentives for the entities responsible for increasing energy efficiency, and that incentives are being re-distributed to targeted communities?
- For job creation, how can/will we track where related new jobs are being created and how EJ communities can directly benefit?
- Will the plan result in any displacement of communities (due to job loss, or demolition of older Power Plants, etc...) and how will that be addressed?
- How do we ensure that funds earmarked for communities of action are used appropriately and to greatest effect in these communities?
- How will states work to ensure that training, job creation is distributed fairly to impacted communities? How do we make sure that labor contracts are explicit and benefit the residents of the impacted communities?

CIVIL RIGHTS

- Does the current path to state CPP implementation comply with Title VI of the Civil Rights Act of 1964 and its regulations? Voluntary compliance with civil rights laws is the preferred means to achieve equal justice goals. The following planning process applies to federal agencies and recipients of federal funding, including state and local agencies and private recipients,

to help ensure compliance under Title VI and environmental justice laws and principles.

1. Describe the program or activity.
 2. Analyze the benefits and burdens on all people, including people of color and low-income people. Who benefits and who gets left behind? The analysis can include numerical disparities, statistical studies, and anecdotal evidence; impacts based on race, color, or national origin; inequities based on income and wealth; and the use of GIS (geographic information systems) mapping and census data.
 3. Analyze the alternatives.
 4. Include people of color and low-income people in the decision-making process.
 5. Implement a plan to distribute the benefits and burdens fairly, avoid unjustified discriminatory impacts and intentional discrimination, and comply with civil rights and environmental justice laws and principles.
- There are various tools to ensure equal access and compliance with civil rights and environmental justice laws and principles – aside from litigation by private parties, which requires evidence of intentional discrimination. Federal agencies can guard against intentional discrimination, and unjustified discriminatory impacts, through planning, regulations, data collection and analyses, review of federal funding applications, contractual assurances of compliance by recipients, compulsory self-evaluations by recipients, compliance reviews after funding, investigation of administrative complaints, full and fair public participation in the compliance and enforcement process, and termination and deferral of funding. The US Department of Justice can enforce the statute and regulations in court.

This goal of this guidance is to set a framework for a path for meaningful engagement between environmental justice advocates, regulators and other interested stakeholders. While the focus of this document is related to the process around the implementation of EPA's Clean Power Plan, it is our hope that the suggested practices will be used beyond the Clean Power Plan, at all levels, on issues of permitting, compliance and potentially other environmental, energy, transportation and public health policy making processes. Most importantly, we hope that other issues or concerns for environmental justice communities can be concurrently addressed as well.



RESOURCES & TOOLS

California Communities Environmental Health Screening Tool, Version 1 (CalEnviroScreen 1.0). <http://www.oehha.ca.gov/ej/ces042313.html>

Title VI Civil Rights News

http://www.justice.gov/crt/about/cor/Pubs/newsletter/news@fcs/spring2015/Spring_2015_Newsletter.pdf

Guidance on Considering Environmental Justice During the Development of Regulatory Actions,

<http://www.epa.gov/environmentaljustice/resources/policy/considering-ej-in-rulemaking-guide-final.pdf>

Model Guidelines for Public Participation

<http://www3.epa.gov/environmentaljustice/resources/publications/nejac/recommendations-model-guide-pp-2013.pdf>

Potential Adverse Impacts Under the Definition of Solid Waste Exclusions (Including Potential Disproportionate Adverse Impacts to Minority and Low-Income Populations), <http://www.regulations.gov/#!documentDetail;D=EPA-HQ-RCRA-2010-0742-0371>

Environmental Justice Leadership Forum on Climate Change: Clean Power Plan Tool Kit including:

Sample EJ Analysis, comments from Environmental Justice Advocates:
<http://www.ejleadershipforum.org/clean-power-plan-tool-kit/>

Urban Air Toxics report

<http://www2.epa.gov/sites/production/files/2014-08/documents/082114-urban-air-toxics-report-congress.pdf>

Union of Concerned Scientists Coastal Impacts Analysis

<http://www.ucsusa.org/sites/default/files/attach/2014/10/encroaching-tides-full-report.pdf>

The Environmental Public Health Tracking Network from the Centers for Disease Control, <http://ephtracking.cdc.gov/showHome.action>

EJSCREEN Tool, <http://www.epa.gov/ejscreen>

Facility Level Information on Greenhouse Gases Tool (FLIGHT),
<http://ghgdata.epa.gov/ghgp/main.do>

The Contested Terrain of Environmental Justice Research: Community as Unit of Analysis

http://naulibrary.org/dglibrary/admin/book_directory/Environmental_management/5963.pdf

National Environmental Justice Advisory Council Reports:

Ensuring risk reduction in communities with multiple stressors: Environmental justice and cumulative risks/impacts

<http://www3.epa.gov/environmentaljustice/resources/publications/nejac/nejac-cum-risk-rpt-122104.pdf>

BACKGROUND ON THE ENVIRONMENTAL JUSTICE LEADERSHIP FORUM ON CLIMATE CHANGE(EJ FORUM)

The EJ Forum and our partners represent 43 community based environmental justice organizations across 19 states that live and work in environmental justice communities where residents are less likely to recover from extreme weather events, and where industrial facilities and transportation routes release pollution that continues to heat up our planet and harm our health. Because low income communities, and/or communities of color experience the most negative impacts of pollution and climate change, we have purposefully engaged in all elements of the President's Climate Action Plan since 2013, with our most significant efforts and advocacy around the Clean Power Plan.

Members of the Environmental Justice Leadership Forum on Climate Change

Advocates for Environmental Human Rights (New Orleans, Louisiana)
 Alaska Community Action on Toxics (Anchorage, Alaska)
 Arbor Hill Environmental Justice (Albany, New York)
 Arctic Village (Fairbanks, Alaska)
 Asian Pacific Environmental Network (Oakland, California)
 CATA -The Farmworkers Support Committee (Glassboro, New Jersey)
 Center for Earth, Energy & Democracy Minneapolis, Minnesota
 CIDA, Inc. (Houston, Texas)
 The City Project (Los Angeles, California)
 Communities for a Better Environment (Oakland, California)
 Connecticut Coalition for Environmental Justice (Hartford, Connecticut)
 Deep South Environmental Justice Center (New Orleans, Louisiana)
 Detroiters Working for Environmental Justice (Detroit, Michigan)
 East Michigan Environmental Action Council (Detroit, Michigan)
 Energy Justice Network (Philadelphia, Pennsylvania)
 Environmental Health Coalition (National City, California)
 Environmental Justice Action Group of Western New York (Buffalo, New York)

Environmental Justice Advocates of Minnesota (Minneapolis, Minnesota)
 Environmental Justice Health Alliance for Chemical Policy Reform (Brattleboro, Vermont)
 Got Green (Seattle, Washington)
 Green Door Initiative, Inc., (Detroit, Michigan)
 Harambee House (Savannah, Georgia)
 Indigenous Environmental Network (Bemidji, Minnesota)
 Jesus Peoples Against Pollution (Columbia, Mississippi)
 Kentuckians for the Commonwealth (London, Kentucky)
 Kingdom Living Temple (Florence, South Carolina)
 Kingsley Association (Pittsburgh, Pennsylvania)
 Land Loss Prevention Center (Durham, North Carolina)
 Little Village Environmental Justice Organization (Chicago, Illinois)
 Los Jardines Institute (The Gardens Institute) (Albuquerque, New Mexico)
 New Jersey Environmental Justice Alliance (Trenton, New Jersey)
 OPAL Environmental Justice Oregon (Portland, Oregon)
 People Organized in Defense of Earth and Her Resources (Austin, Texas)
 People Organizing to Demand Environmental and Economic Rights (San Francisco, California)
 Physicians for Social Responsibility – Los Angeles (Los Angeles, California)
 Southeast Care Coalition (Newport News, Virginia)
 Sustainable Community Development Group (Washington, DC)
 TEJAS (Houston, Texas)
 Texas Southern University (Houston, Texas)
 The Labor/Community Strategy Center (Los Angeles, California)
 WE ACT for Environmental Justice (New York, New York/Washington D.C)

ALLIES

Alaska Wild (Fairbanks, Alaska)
 Center for Energy and Environmental Justice (Biloxi, Mississippi)
 Metro St. Louis Coalition for Inclusion and Equity (St. Louis, Missouri)

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Lisa Abbott, Kentuckians for the Commonwealth; Rev. Leo Woodberry, Kingdom Living Temple; Dr. Nicky Sheats, New Jersey Environmental Justice Alliance; Brent Newell Esq, Center on Race, Poverty & the Environment; Dr. Erica Holloman, Southeast CARE Coalition; Mr. Robert Garcia and Ms. Ariel Collins, The City Project; Nelson Carrasquillo, CATA Farmworkers; Ms. Donele Wilkins, Green Door Initiative; Peggy Shepard and Cecil Corbin-Mark, WE ACT for Environmental Justice; Monique Harden Esq, Advocates for Environmental Human Rights, Sharon E. Lewis, Connecticut Coalition for Environmental Justice, Juliana Pino, Little Village Environmental Justice Organization, Dr. Charlotte Keys, Jesus Peoples Against Pollution, William Copeland, East Michigan Environmental Action Coalition, Shana Lazerow Esq., Communities for a Better Environment.

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 Barbara Gottlieb, Physicians for Social Responsibility
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 Dr. Meg Power, National Community Action Foundation
 Vernice Miller Travis, member of National Environmental Justice Advisory Council
 Ignacio Moreno Esq, Founder & CEO of iMoreno Group
 Myra Reece, South Carolina Dept. of Environmental Health and Control
 Deidre Sanders, member of the National Environmental Justice Advisory Council
 Evan Weber, US Climate Plan
 Carol Werner, Environmental And Energy Study Institute
 Dr. Sacoby Wilson, University of Maryland

The views and opinions expressed in this document are those of the members of the Environmental Justice Leadership Forum on Climate Change. Please do not attribute these views to the members and the organizations that are represented on the External Advisory Team.

1. 40 CFR Part 60 Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units; Final Rule

<https://www.gpo.gov/fdsys/pkg/FR-2015-10-23/pdf/2015-22842.pdf>

2. Angelita C., et al v. California Department of Pesticide Regulation

3. Key Terms in Environmental Justice

http://www.ejleadershipforum.org/wpcontent/uploads/2015/07/EJ-Dictionary-Terms_rev-07-28-2015.pdf

4. ibid

5. Dr. Bunyan Bryant, Environmental Justice Advocate: Working for Economic and Environmental Justice

6. Key Terms in Environmental Justice

http://www.ejleadershipforum.org/wpcontent/uploads/2015/07/EJ-Dictionary-Terms_rev-07-28-2015.pdf

7. ibid

8. Michael Rodriguez, MD, MPH; Marc Brenman; Marianne Engelman Lado, JD; and Robert García, JD, Using Civil Rights Tools to Address Health Disparities Policy Report (The City Project 2014), goo.gl/mYvhOm.

9. EPA's Clean Power Plan, Climate Change And African Americans

<http://www3.epa.gov/airquality/cppcommunity/afam-climate-change.pdf>

10. Asthma in the US May 2011 Vital Signs <http://www.cdc.gov/vitalsigns/asthma/>

11. EPA's Clean Power Plan, Climate Change And African Americans

<http://www3.epa.gov/airquality/cppcommunity/afam-climate-change.pdf>

12. EPA's Clean Power Plan, Climate Change and The Hispanic & Latino Community

<http://www3.epa.gov/airquality/cppcommunity/hispanic-climate-change.pdf>

13. ibid

14. ibid

15. EIA Training Resource Manual <http://www.unep.ch/etb/publication/EIAman/SecETopic5.pdf>

16. 40 CFR Part 60 Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units; Final Rule

<https://www.gpo.gov/fdsys/pkg/FR-2015-10-23/pdf/2015-22842.pdf>

17. EJ Screen <http://www.epa.gov/ejscreen>

18. Center on Race, Poverty & Environment CPP

Comment <http://www.ejleadershipforum.org/wp-content/uploads/2015/07/CRPE-CPP-Comment.pdf>

19. Adele Morris and Evan Weber, To Comply with the Clean Power Plan, States Should Tax Carbon <http://thehill.com/blogs/congress-blog/energy-environment/252476-to-comply-with-the-clean-power-plan-states-should-tax>

To: McCabe, Janet[McCabe.Janet@epa.gov]; Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]
From: McGrath, Shaun
Sent: Thur 3/10/2016 5:40:27 PM
Subject: briefing document: Monument Butte
DRAFT Monument Butte Briefing Addendum 3-9-2016.docx

Janet and Cynthia,

The Administrator's Office has asked for briefing memo on our call tomorrow morning regarding Monument Butte EIS. Are you both comfortable with us forwarding the same memo that R8 developed with OFA for our call today (attached)?

Shaun

To: McCabe, Janet[McCabe.Janet@epa.gov]
Cc: Saltman, Tamara[Saltman.Tamara@epa.gov]; Whitehurst, Shanika[whitehurst.shanika@epa.gov]
From: Shaw, Betsy
Sent: Wed 3/9/2016 11:08:59 PM
Subject: Materials for ECOS EJ in Permitting Call tomorrow
[ECOS - EPA EJ Permitting Call Agenda 3 10 16.pdf](#)
[Talking Points for the EJ in Permitting Call 3-10-16 V4.docx](#)
[Notes from 11 12 15 ECOS-EJ Permitting Meeting v2.docx](#)

Hi Janet,

Attached please find the agenda and talking points for the second call on EJ in Permitting we have schedule with ECOS for tomorrow from 1 – 2:30 p.m. I'm also sending along the notes from the first call that took place on November 12 and will I'll drop off hard copies as well. We're not presenting tomorrow, so it's not a heavy lift.

Thanks,

Betsy

November 12, 2015

Notes from ECOS Meeting – EJ in Permitting

- **Attendees:**

States Present: Alabama, California, Colorado, Connecticut, Delaware, Minnesota, Mississippi, Missouri, Montana, New York (NYSDEC), Ohio, Oregon, Pennsylvania, Tennessee
EPA: Region 5, Region 2, OAR, OSWER/OLEM, and OGC

- **Purpose:**

Meeting is a joint discussion between the states and EPA on EJ in permitting – State and EPA leaders discuss and share ideas on how to incorporate EJ principles in permits, learn from each other, and improve our own programs

Introductory Remarks:

- Opening remarks by ECOS President, Martha Rudolph (CO), presentations on state perspectives (MN, CA, TN and MS), and remarks by EPA on efforts/successes so far

MN Presentation (John Stine)

- Priority to eliminate disproportionate environmental impacts
- Developed a comprehensive state strategy – available on website. Finalizing in December. Forming statewide EJ advisory group as well.
- Trying to work outside scope of permitting authorities – more outreach, resources for communities, more engagement with communities (e.g. for permits, before enforcement actions).
- Focus on air permitting/air quality
- Need to understand communities better first – historically understood environment more than people, trying to close that gap. Looking for scalable efforts and to scale efforts commensurate with risk.
- Example outcomes they have used: taking a lower PTE than required but still higher than current level to keep some “headroom” but not as much; add additional control strategies
- Can’t start conversation with facilities when permit is up for renewal – has to be an on-going conversation about what they can be doing to address disparate impacts, of which permit renewal is only one part. Important to let regulated folks know that we are working with unregulated sources too – want everyone to be treated equally. Early engagement is the key to working with both the community and facilities.
- University of MN case study first intensive effort to look at and engage surrounding community on heat and electricity. Outreach/public meetings in multiple languages. Significant analysis of risks in area, contribution of facility to PM2.5 modeled.
- Working with 12 of the biggest emitters to serve as pilot projects
 - Chose companies based on type of emission
 - Asked facilities to consider their relationships with neighbors
 - Focused on a specific emission reduction (e.g. PM 2.5, ozone, etc.)
 - Some of the modifications included additional source control technologies especially if the facility was already undergoing a process modification

- Find that facilities and emissions sources are invested in the community – they want to be viewed positively by their neighbors (including community) – want to have a good reputation
- Bringing together community and industry in effort
- Go to public/community events to share information.
- Separate tribal engagement
- Find there is a gap in trust amongst stakeholders. Building trust is a personal responsibility and takes time.
- Focusing more on cumulative impacts and how to reflect them in air permits
- Significant outreach with CPP state plan development underway, including with 11 Tribes

TN Presentation (Kendra Abkowitz-Brooks)

- Believe that using EJ specifically in permit decisions is not supported by TN law and limited by data, modeling tools, science of air pollution, limited time to review permits; instead focusing on outreach and state staff training
- Provide EJ workshops for state staff
- Office of External Affairs created a toolkit to aid with the public participation process which includes environmental justice related topics
- Environmental and education initiatives
- Environment justice activities are mainly conducted through outreach
- Created an EJ component in brownfields grant applications
- Permits are time dependent – difficult to incorporate full stakeholder engagement/outreach process and meet permit deadline requirements (state rules)
- Geographic dispersion related to air is difficult when it comes to EJ in permitting – hard to determine impacts in a specific location
- Difficulty because of urban vs rural populations – having one approach that works for everyone
- In many cases a “legacy issue”, i.e. site pre-dates surrounding community and risks/lack of risks poorly communicated
- Are looking at enhanced outreach for CPP plan
- Question from NYSDEC – how receptive are state staff to attending EJ workshops?

CA Presentation (Arsenio Mataka)

- CA at a point where they’re getting to outcomes – participation part is always an area to improve but underway – but CA is at decision point where EJ can affect if a permit is issued or not. Have had some EJ statutes in place for some time, now moving into the cumulative impacts realm. Not easy – still figuring out how to do it. Need to see how things go over next year or two.
- Focus primarily on hazardous waste permits – Governor signed bill S673 to **require** consideration of community’s vulnerabilities and to consider facility’s compliance history among other things. This analysis applies to both new permits and permits up for renewal.
- Developed a screening tool to look at cumulative impacts (environmental and demographic indicators) in communities – used to frame conversation around EJ. Available to public.
- Tools are good in terms of what the issues are, but not what the IMPACTS of the issues are on the community

- Example outcomes: Hazardous waste facility agreed to cleaner technology for trucks – interested in being better neighbors. Also do more monitoring and truck re-routing
- Before starting with permits need to understand the community and what the impacts on them are to identify what/how to address

EPA Remarks

- Background on EJ in Permitting efforts to date
- Voluntary actions and provisions have been the primary way we've succeeded in addressing community concerns in permits. Shared specific permit examples that included requirements to address community concerns.

MS Presentation (Melissa McGee-Collier)

- Similar concerns as TN and CA
- Also no EJ law, but operates "as if" EJ executive order applies to them and believe it may, given delegated programs
- Comprehensive state approach to EJ including:
 - "enSITE" state database where programs can flag sites so other programs know there is additional interest there (e.g. enforcement, EJ, compliance, etc.)
 - Checklist for permit writers that includes EJ and community items
 - Permit writer required to visit every site before starting work on permit
 - Early public notice email list, can indicate which counties you want to receive notification as soon as a permit application is received
 - Offer lots of training and give CEUs to engineers
 - Roundtable discussion with county and city planners and local governments re: EJ and related issues
- Example outcomes: Met with industries along the Gulf Coast and negotiated inclusion of a "dust program", fugitive dust requirements, within their permits

NEXT STEPS

- Lots of interest in this topic – conversation to be continued on another ECOS call in January 2016 with MA and NY likely presenting; CA may have more info as well.